

KHR-8
October 1, 1984

Chronology of KSC and KSC Related Events for 1983



25th Anniversary
1958-1983

National Aeronautics and
Space Administration

John F. Kennedy Space Center



CHRONOLOGY OF
KSC AND KSC-RELATED
EVENTS FOR
1983
SELECTED
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FOREWORD

Space Shuttle Challenger successfully completed its maiden voyage in April, then in June was again launched with a crew that included America's first woman astronaut. NASA's 25th birthday was commemorated in 1983. President Reagan stated that in its life, the agency had amassed "an unsurpassed record of scientific and technical achievements which established the United States as the world leader in aerospace research and administration."

Dr. Kurt H. Debus, the first director of the Kennedy Space Center, died in October at the age of 74. Lockheed Space Operations Company was awarded the largest space services contract ever in winning the multi-billion dollar Shuttle Processing Contract.

Materials for this chronology were selected from Aviation Week and Space Technology, Defense Daily, Miami Herald, Sentinel Star (Orlando), Today (Cocoa), Spaceport News (KSC), NASA News Releases, and other sources. The document is intended to serve as a record of KSC events and as a reference source for historians and other researchers. Arrangement is by month; items are by date of the published sources. Actual date of the event may be indicated in parenthesis, when the article itself does not make that information explicit.

Research of materials and preparation for publishing were by Historian-archivist Ken Nail, Jr., with the assistance of Elaine Liston, both of New World Services, Inc.

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JANUARY 1983

January 3: Butler Construction Company (Rockledge, Florida) was awarded a \$161,000 fixed-price contract by KSC to construct a 26-trailer complex south of the Operations and Checkout Building in the Industrial Area. The contract runs from December 21, 1982, through March 21, 1983. [Malone. NASA NEWS RELEASE No. 1-83, Jan. 3, 1983.]

<> Launch pad engineers were unsuccessful in attempts to find the source of a hydrogen leak in Challenger's rear engine compartment. The leak was first discovered following a 20-second test firing of the three main engines December 18. Launch was delayed until April 4. [Adams. TODAY, p. 1A, Jan. 4, 1983. Yacenda. TODAY, pp. 1A & 14A, Apr. 5, 1983.]

January 5: Five space shuttle launches and nine unmanned launches were scheduled for 1983 as of this date. See Appendices for complete listing of 1983 launches. ["Challenger Poised for Maiden Flight," THE TRIBUNE, p. 4A, Jan. 5, 1983.]

<> "After a three-hour teleconference between officials in Washington, Houston, and the Kennedy Space Center, Shuttle program director General James Abrahamson said if the Challenger engines have to be throttled in another test firing, the launch could slip well into February." A second flight readiness firing test was conducted January 25, 1983. [Adams. TODAY, p. 1A, Jan. 6, 1983. Adams. TODAY, pp. 1A & 14A, Jan. 26, 1983.]

January 10: A failure in an electronics box was responsible for a 24-hour delay in the Shuttle countdown dress rehearsal. The small box, designed by Westinghouse Electric Corp. (Lima, Ohio) converts direct current from the ground into alternating current. [Adams. TODAY, pp. 1A & 12A, Jan. 11, 1983.]

<> Kennedy Space Center awarded United Space Boosters, Inc. (Huntsville, Alabama) a \$13,860,875 extension of its current contract to perform processing operations for the Shuttle's

solid rocket boosters. The cost-plus-incentive-fee/award fee contract runs from January 1 through September 30, 1983. [Tucker. NASA NEWS RELEASE No. 8-83, Jan. 18, 1983.]

January 11: The second firing test of Challenger's main engine was predicted to cost NASA \$1.5 million, according to Edwin Dale, spokesman for the Office of Management and Budget in Washington, D.C. [Adams. TODAY, pp. 1A & 16A, Jan. 12, 1983.]

<> Shuttle crewmen Dr. Story Musgrave, Paul Weitz, Karol Bobko and Donald Peterson crawled into the Challenger's cockpit and made a simulated and silent liftoff at 11:04 a.m. The astronauts had to override computers that improperly registered helium pressures at 30 seconds before the mock liftoff. [Adams. TODAY, p. 16A, Jan. 12, 1983.]

January 12: Boeing Services International was awarded a \$13 million contract expansion at KSC. The expansion adds small purchase and receiving functions to BSI's contract for supply and transportation services. ["Boeing Wins \$13 Million Contract Expansion," TODAY, p. 14C, Jan. 12, 1983.]

January 17: Ham, the first chimpanzee to ride a rocket into space, died at age 26 at the North Carolina Zoological Park where he had lived for the past 2 1/2 years. Ham rode a Redstone rocket from Cape Canaveral Air Force Station in a sub-orbital flight January 31, 1961, after which he was transferred to the National Zoo in Washington until 1980. ["Ham, the First Chimp to Ride Rocket Into Space, Dies," TODAY, p. 1A, Jan. 19, 1983.]

January 19: "EG&G 'wants to be a good neighbor,' the firm's highest-ranking Florida executive assured Brevard County business representatives....

"The Massachusetts-based firm took over operation and maintenance at Kennedy Space Center 19 days ago and everything is falling into place, Jim Dubay, president and general manager of EG&G Florida, said...." [Stephens. THE TRIBUNE, p. 3A, Jan. 19, 1983.]

<> "C.E.M. Enterprises, Inc., doing business as Sunshine Painting of Orlando," was awarded a "\$92,299 contract by TWA Services, Inc., for the complete refurbishment of the Kennedy Space Center Visitors Center outdoor exhibits, including rockets, swing arm and lunar module.

"Also awarded a contract by TWA Services, Inc., was the J.P. Goodwin Corp., of Merritt Island. It will refurbish and modify handicapped restroom facilities at the Visitors Center. Both contracts are part of the \$8.5 million expansion program currently under way at the center." ["TWA Awards Contracts," THE TRIBUNE, p. 5A, Jan. 19, 1983.]

January 20: "NASA officials...ruled out a proposed move of United Space Boosters, Inc., from Kennedy Space Center to a private site north of the Canaveral Barge Canal on Merritt Island. The space agency's announcement came...in the form of a letter from Air Force Lt. Gen. James Abrahamson, the agency's associate administrator for space flight, to East Merritt Island Homeowners Association President Sue Ford...." [Yacenda. TODAY, p. 1B, Jan. 21, 1983.]

<> The second firing of Challenger's main engines was scheduled for January 25, 1983.

NASA also announced that it would accept proposals from American industry for the Shuttle Processing Contract to maintain and launch the Shuttle. (A team of contractors headed by Lockheed Corporation was awarded the \$6 billion contract on September 7, 1983.) [Adams. TODAY, p. 16A, Jan. 21, 1983. Stein. THE ORLANDO SENTINEL, pp. A-1 & A-7, Sept. 8, 1983.]

January 21: Richard Greenup, former KSC engineer from 1965 to 1970, was named to head the mass transit division of Florida's Department of Transportation. ["Former KSC Engineer Named to DOT Post," TODAY, p. 2B, Jan. 25, 1983.]

January 24: NASA announced that the seventh Shuttle mission would land at Kennedy Space Center with Edwards AFB as backup landing site.

(STS-7 landed at Edwards on June 24 following its June 18 launch from KSC.) ["Shuttle 7 Planned for Kennedy Space Center Landing," AVIATION WEEK & SPACE TECHNOLOGY, p. 29, Jan. 24, 1983. "Challenger Hustles for Home," TODAY, p. 12A, Jun. 28, 1983. Yacenda. TODAY, pp. 1A & 18A, Jun. 19, 1983.]

January 25: "As in the first engine test December 18, engineers discovered a leak of hydrogen gas in the 18-foot-long compartment just forward of the three engine nozzles." Lt. Gen. James Abrahamson, associate administrator, said that a late February launch "is not achievable." The mission was originally scheduled to commence on January 20, 1983. [Adams. TODAY, pp. 1A & 14A, Jan. 26, 1983.]

<> The Infrared Astronomical Satellite (IRAS) was launched at 6:17 p.m. PST aboard a two-stage Delta rocket from Vandenberg Air Force Base, California. ["Delta Rocket Lifts Infrared Telescope Into Space," TODAY, p. 14A, Jan. 26, 1983.]

January 26: Jobear, Inc. (Indianapolis, Florida) was awarded a \$240,685 KSC contract to modify the existing wastewater treatment plant which processes sewage for the launch complex 39 area. The award is a small business set-aside, according to Lisa Malone, KSC spokeswoman. ["Jobear, Inc., Wins Contract at KSC," THE TRIBUNE, p. 2A, Jan. 26, 1983.]

<> NASA headquarters officials considered using expendable Delta rockets "to put some of the Space Shuttle's communication satellites into space because of the domino effect of delayed Shuttle launches..." [Adams. TODAY, pp. 1A & 14A, Jan. 27, 1983.]

January 27: The Apollo 204 fire occurred 16 years ago; it claimed the lives of astronauts Gus Grissom, Ed White and Roger Chaffee. ["16 Years Since Tragedy," TODAY, p. 12A, Jan. 27, 1983.]

January 29: The hydrogen leak which delayed the maiden voyage of Space Shuttle Challenger was caused by a tiny crack in the spacecraft's No. 1 engine, said Dick Young, spokesman

for Kennedy Space Center. The crack was located in the combustion chamber manifold. ["NASA Traces Leak to Engine Crack," TODAY, p. 1A, Jan. 30, 1983.]

January 31: Explorer 1, this country's first satellite into space, was launched from LC 26 at 10:48 p.m. EST aboard a Jupiter C rocket on January 31, 1958. [Adams. TODAY, p. 1B, Jan. 31, 1983.]

FEBRUARY 1983

February 1: Father Bruce Medaris, pastor emeritus of the Anglican Church of the Incarnation in Orlando, Florida, celebrated his 80th birthday on this date. Twenty-five years ago, he was Army Major General John Bruce Medaris and in charge of the Redstone Arsenal at Huntsville, Alabama, when America's first satellite, Explorer 1, was launched. [Wadsworth. THE ORLANDO SENTINEL, p. E-2, Feb. 1, 1983.]

<> Arthur Boschen, president of New World Construction (Titusville, Florida) and Phillip Akwa, president of Capital Communications Corp. (Milwaukee, Wisconsin) - NASA contractors - were convicted of "trying to defraud the government at the Kennedy Space Center." They were given three-year prison sentences by a federal judge and their companies were hit with large fines. ["The Space Coast: NASA Contractors Sentenced, Fined," TODAY, p. 2B, Feb. 2, 1983.]

February 3: An eight person NASA review team concluded that electronic sensors in the fan motors of astronaut Joseph Allen's spacesuit [during STS-5] had been exposed to moisture from breath and perspiration because of inadequate sealing. Other "avoidable mistakes by the contractors" included the failure of a motor powering a circulation fan, water separator and water pump in Allen's suit and a control regulating oxygen pressure in William Lenoir's suit failed, too. ["Avoidable Mistakes By Contractors Blamed for Spacesuit Failures," DEFENSE DAILY, p. 195, Feb. 3, 1983.]

<> NASA Associate Administrator Gen. James Abrahamson said a decision has yet to be made on whether to relocate the solid rocket booster reassembly plant from KSC to Marshall Space Flight Center in Huntsville, Alabama.

NASA officials announced on May 17 that the refurbishment plant for the Space Shuttle solid rocket boosters would be built on Kennedy Space Center property after the current booster contract (held by USBI) expires in 1986. [Mecham and Yacenda. TODAY, p. 1A, Feb. 4, 1983. Dickerson. TODAY, p. 1A, May 18, 1983.]

February 8: A series of critical tests of Space Shuttle Challenger's ability to communicate (from Kennedy Space Center) with Mission Control at Johnson Space Center in Houston, Texas, were successfully conducted. Houston sent commands to Challenger via satellite communications links during the all-day Mission Control Interface Test.

Tests were also conducted on new Shuttle rocket motors.
[Yacenda. TODAY, p. 12A, Feb. 9, 1983.]

February 9: Chemko (Titusville, Florida) won NASA/KSC contracts - worth \$137,778 - for the procurement of one gaseous nitrogen regulator panel, one pipe and support assembly regulator panel and supporting documentation used in vehicle purging and pressurizing at Vandenberg Air Force Base, CA.

The firm-fixed-price contract runs from Feb. 2, 1983, to April 16, 1984. [Malone. KSC NEWS RELEASE No. 22-83, Feb. 9, 1983.]

February 10: The Holloway Corporation (Titusville, Florida) was awarded a firm-fixed-price contract worth \$149,270 by Kennedy Space Center for the procurement of two range safety checkout systems. These would be installed in Mobile Launcher Platform 3 at KSC and Space Launch Complex 6 at VAFB. The contract runs from February 8, 1983, to January 9, 1984. [Malone. KSC NEWS RELEASE No. 23-83, Feb. 10, 1983.]

February 12: Cape Canaveral Air Force Station's launch sites were recommended for placement on the National Register of Historic Places as the result of a study by National Parks Service staffer Harry A. Butowski.

Approval of the designation would mean that the Air Force has to consult with a board of historians before altering sites considered historic. [Cone. TODAY, pp. 1B & 3B, Feb. 12, 1983.]

February 14: Space shuttle program officials plan to use the shuttle Enterprise at Edwards AFB, California, to demonstrate the feasibility of conducting towing and

convoying operations at night in preparation for the scheduled space shuttle landing this summer at the conclusion of the eighth mission. The Enterprise has been used during approach and landing tests. ["Industry Observer," AVIATION WEEK AND SPACE TECHNOLOGY, p. 13, Feb. 14, 1983.]

<> NASA told contractors it wants to get out of the Delta launch vehicle program after 12 more flights, but the agency may buy at least three additional Deltas because of shuttle delays. NASA Administrator James M. Beggs must decide how many more Deltas the agency is willing to fund. Contractors asked for an early decision to end uncertainties regarding manpower and supplier contracting. [Kolcum. AVIATION WEEK AND SPACE TECHNOLOGY, p. 22, Feb. 14, 1983.]

February 15: Engineers checking Space Shuttle Challenger's replacement engine confirmed that the motor had an oxygen leak....The announcement made it certain that Challenger's maiden launch - already delayed from late January - would be set back to at least mid- or late-March....KSC spokesman Jim Ball said technicians located the leak - which NASA termed "very small" but still greater than tolerance levels - in a line that leads into the oxygen heat exchanger....Hoping to keep further delays to a minimum, NASA decided to bring two other engines to KSC.

KSC workers prepared to load a 2 1/2-ton communications satellite into the spaceplane's cargo bay....The NASA Tracking and Data Relay Satellite (TDRS) was fueled over the weekend and technicians completed last-minute checks before installation, expected February 16....Hydrazine was also loaded into Challenger's auxiliary power units despite winds gusting up to 38 knots. [Yacenda. TODAY, pp. 1A & 14A, Feb. 15, 1983.]

February 16: Kennedy Space Center awarded Behe and Umholtz Electrical Contractors, an Orlando, Florida small business firm, a \$97,700 contract in connection with the renovation of a portion of the Launch Control Center....The fixed-price contract calls for Behe and Umholtz to perform electrical work in the modifications of Firing Room 4 at the eastern end of the LCC. Firing Room 4, which now houses the computer consoles and data display boards, would be turned into additional office space and a conference room.... [Tucker. KSC NEWS RELEASE No. 25-83, Feb. 16, 1983.]

<> Indonesia's telecommunication chief Sukarno Abdul Rachman visited Kennedy Space Center and said he doesn't expect delays in the sixth Space Shuttle mission to seriously affect his country's satellite program....Meanwhile, preparations for a mid- or late-March launch of the Shuttle Challenger got another boost from February 15's successful test-firing of a possible replacement engine.

Abdul Rachman and four other Indonesian officials got a look at their spacecraft, called a Palapa-B, during a stop at KSC. Rachman said his country prefers to keep its launches with the Shuttle, mainly because of the cheaper cost, compared with single-use rockets. He said, however, that Indonesia would not rule out other vehicles, including the competing European Ariane and the American Delta rockets... Technicians continued modifying electricity-producing fuel cells aboard Challenger. [Yacenda. TODAY, p. 18A, Feb. 17, 1983.]

<> Computer Science Corp. (Falls Church, Virginia) won a \$33.9 million contract extension to provide communications and instrumentation services for the Space Shuttle program at Kennedy Space Center. [Kassak. TODAY, p. 14C, Feb. 16, 1983.]

February 18: A NASA investigating panel concluded in its final report that the loss of the two solid rocket boosters, which helped power the fourth Space Shuttle flight to orbit, was caused by a switch in the booster's decelerator systems....

The cause of the malfunction in the STS-4 solid rocket booster decelerator system was found to be the premature separation of one of the two riser attachments on each of the main parachutes. This occurred at approximately 365 seconds after liftoff co-incident with the planned separation of the frustrums from the boosters, rather than at water impact as intended.... [Garrett. NASA NEWS RELEASE No. 83-19, Feb. 18, 1983.]

February 20: Britain's Prince Andrew and a buddy from the Royal Navy - Sub-Lt. Ian Hendry - got a special private tour of the Kennedy Space Center and its space shuttle facilities.

Andrew, a helicopter pilot on the Invincible, an anti-submarine aircraft carrier, and Hendry saw the Columbia, now being refurbished in the Orbiter Processing Facility; the massive Vehicle Assembly Building; the Launch Control Center and Challenger being prepared for its first mission.

"He was very enthusiastic about the center," Hugh Harris, KSC spokesman, said. "He is reported to have asked a lot of good questions, based on his background knowledge as a pilot, and seemed to be very knowledgeable about the shuttle program in general." ["Prince, Comrade Visit Space Center," THE ORLANDO SENTINEL, Feb. 22, 1983.]

<> A possible replacement for one of Challenger's three main engines arrived at Kennedy Space Center late on February 20th....The engine, which formerly powered Columbia on its five flights, arrived by truck from Rocketdyne's Canoga Park, California facility where technicians were running the motor through a series of tests. A second possible replacement engine was expected to arrive February 28 from NASA's National Space Technology Laboratories in Bay St. Louis, Mississippi. Engineers preferred to use that second engine in Challenger and hoped to install it as soon as it arrived at KSC. ["Substitute Engine Arrives," TODAY, p. 18A, Feb. 23, 1983.]

February 22: NASA officials laid out a new strategy for meeting the Space Shuttle's increasingly tight 1983 launch schedule, and said Shuttle Challenger could begin its maiden voyage on March 19 or 20...Lt. Gen. James A. Abrahamson, NASA associate administrator and chief of shuttle operations, called the tentative dates for Challenger's launch "optimistic" possibilities and conceded that neither Challenger nor the Shuttle program are out of the woods yet....Through what Abrahamson called a "reallocation of resources," workers for both NASA and private contractors at KSC will immediately increase operations from three to four shifts, working around the clock and weekends until Challenger is launched.

The agency had no accurate figures on how much Challenger's delays would cost in overtime pay, equipment and other extra expenses. Abrahamson said the speedup was designed to keep overtime to a minimum. [Yacenda. TODAY, pp. 1A & 18A, Feb. 23, 1983.]

February 23: NASA was preparing to destroy the gantry from which Apollo 11 went to the moon when national and state historical preservation organizations threatened to sue. The tower was also used to launch several Skylab missions and the Apollo-Soyuz Test Project in 1975.

NASA had to decide whether to disassemble the tower for later restoration or to destroy the tower entirely, selling the steel and other metals for scrap as has happened to other Apollo-era launch towers.

Best Wrecking Co. (Detroit, Michigan) hired by NASA to dismantle the tower estimated it would cost \$574,601 to demolish the tower; it would cost an additional \$1.8 million to dismantle in a manner which would allow later restoration. NASA had estimated the original expense at closer to \$4 million. [Orlando. THE TRIBUNE, p. 1A, Feb. 23, 1983. Yacenda. TODAY, p. 2B, Mar. 23, 1983.]

<> Replacement of a defective electricity-producing cell aboard the Space Shuttle Challenger took longer than expected, prompting NASA officials to postpone loading Challenger's cargo for one more day....Installation of the new fuel cell was completed February 24....Workers spent the remainder of the day cleaning Challenger's cargo area. Installation of the cargo was expected to be completed February 26. [Yacenda. TODAY, p. 12A, Feb. 25, 1983.]

February 24: Testing of the two main rocket engines still aboard Challenger continued. Heat shields were installed around the engines and the No. 2 motor was checked for gas leaks, NASA said. [Yacenda. TODAY, p. 12A, Feb. 25, 1983.]

February 25: Technicians checking Challenger's engines found yet another gas leak, this time in the Orbiter's No. 2 engine....NASA officials said it was premature to say whether another lengthy delay would result from this latest leak. KSC Chief spokesman Hugh Harris said officials planned to confer on the 26th to consider what to do about this third leak....Harris said the conference would be conducted by telephone to involve specialists at other space centers and officials at NASA's Washington, D.C. headquarters. [Yacenda. TODAY, p. 1A, Feb. 26, 1983.]

February 26: Following a teleconference among various centers' specialists and administrators at its Washington headquarters, NASA officials decided to remove Challenger's defective No. 2 engine and KSC workers immediately set about the task....NASA spokesmen had no estimate of how much more - if any - Challenger's maiden flight would be delayed....The motor was expected to be removed by late on the 27th....NASA associate administrator Lt. Gen. James A. Abrahamson was visiting in south Florida when the problem was discovered and came to KSC where he inspected the Orbiter atop launch pad 39A. [Yacenda. TODAY, p. 1A, Feb. 27, 1983.]

February 28: The major space shuttle processing contractors and NASA developed a recovery plan for the seventh through the tenth shuttle launches. The plan was aimed at restoring the program schedule for the ninth mission, Spacelab, and the tenth, a DOD payload.

The plan had a number of unusual work features:

- * Work weeks were to be nonstandard in that a working period might begin and end any day of the week.
- * Workers and managers would be interchanged among processing contractors....
- * A control center would be established to track and manage the work flow. ["Shuttle Schedule Recovery Plan Approved," AVIATION WEEK & SPACE TECHNOLOGY, p. 20, Feb. 28, 1983.]

<> West German payload specialists Ernst Messerschmid and Reinhard Furrer, scheduled to fly aboard Spacelab in July 1985, visited KSC. Messerschmid and Furrer were also scheduled to visit Johnson Space Center, Marshall Space Flight Center, and NASA Headquarters in Washington, D.C. [Yacenda. TODAY, p. 12A, Mar. 1, 1983.]

<> Challenger's engine No. 2 was removed from the Orbiter and No. 3 was expected to be removed March 1. Both engines were to be brought to the Vehicle Assembly Building for repair work. Hugh Harris, KSC spokesman, said officials still hoped for a March liftoff for Challenger's five-day mission. Harris characterized NASA associate administrator Abrahamson as "angry and disappointed," but said it was

premature to say whether criticism was pointed at Rocketdyne (motor manufacturer) or whether any penalties would be levied against the contractor. [Yacenda. TODAY, p. 1A, Mar. 1, 1983.]

MARCH 1983

March 1: Some 146,950 persons toured Kennedy Space Center in February. This represented a 2.3 percent increase over the same period in 1982. Arnold Richman, chief of the Visitors Services Branch, said: "Already we're ahead of figures" for 1981 and 1982, "so we could be headed for our biggest year yet." [Tucker. NASA NEWS RELEASE No. 33-83, Mar. 4, 1983.]

<> Wiltech of Florida Corporation won a \$3 million-plus contract extension from KSC. Wiltech, a small business firm, is responsible for component refurbishment and chemical analysis services at KSC. The contract runs from March 1, 1983, through February 28, 1984. [Tucker. NASA NEWS RELEASE No. 31-83, Mar. 1, 1983.]

<> The head of NASA's Space Station study team told Congress that the agency believes it can build and deploy an evolutionary, modest Space Station at a cost of \$4 to \$6 billion (in constant dollars) and have it in operation by 1991.

"It is NASA's view that a Space Station will be the next logical step in space and our current activities are directed toward developing sufficient information for Congress and the Administration to make an informed decision on the appropriate course of action," John D. Hodge, director of NASA's Space Station Task Force, told the House Subcommittee on Space Science and Applications....["NASA Says Modest Space Station Can Be Built For \$4-\$6 Billion," DEFENSE DAILY, p. 21, Mar. 3, 1983.]

March 2: Kennedy Space Center officials said that preliminary disassembly work to make way for the repairs had started on Challenger's leaky No. 2 and No. 3 main engines...NASA gave no reason for the one-day delay, and KSC spokesman Mark Hess called the delay "just a logistical thing." The shipment of yet another engine to replace Challenger's No. 1 power plant, disabled by a leak in a hydrogen-carrying manifold and removed in early February, was also delayed a day. [Yacenda. TODAY, p. 12A, Mar. 3, 1983.]

March 3: John F. Kennedy Space Center awarded Specialty Maintenance and Construction, Inc. (Lakeland, Florida) a contract valued at \$1,268,836, for the procurement of a second payload canister for Space Shuttle operations. The contract, one set aside for small business firms, runs from March 3, 1983, through February 18, 1984. [Malone. NASA NEWS RELEASE No. 30-83, Mar. 3, 1983.]

<> Rocket specialists began repairing two of Challenger's three disabled main engines at Kennedy Space Center, KSC officials said. The surgery-like repair entails cutting out a 10-inch length of cracked hydrogen line and welding in a replacement section. Initial x-ray checks showed a similar repair on a test engine at NASA's Mississippi test center was successful. [Yacenda. TODAY, pp. 1A & 16A, Mar. 4, 1983.]

March 4: The launch window for Challenger's maiden launch was expected to be a mere 16.9 minutes from 1:30 p.m. to 1:47 p.m. This would be the first afternoon Shuttle launch.

The brevity of the launch window - reduced from an original four hours - was determined by the need for daylight landing conditions at an emergency landing site at Dakar, Senegal, near Africa's western-most tip.

NASA hopes to send Challenger on its five-day mission sometime between March 26 and March 31. [Yacenda. TODAY, pp. 1A & 16A, Mar. 4, 1983.]

<> Kennedy Space Center awarded Rockwell International Corporation (KSC, Florida) a \$31,389,000 contract for Space Shuttle support at Vandenberg Air Force Base, California. The cost-plus-award-fee contract runs from February 28, 1983, through September, 1984, and calls for the design, development, and activation of VAFB Launch and Landing Site Ground Support System equipment and facilities for Air Force Space Shuttle launch operations. [Malone. NASA NEWS RELEASE No. 34-83, Mar. 4, 1983.]

<> NASA officials said that repair work on two of the Space Shuttle Challenger's three main engines was going well. NASA also announced that "some kind of contaminant" had been

observed on Challenger's cargo, the Tracking and Data Relay Satellite (TDRSS) due for deployment during the STS-6 mission. [Yacenda. TODAY, p. 8A, Mar. 5, 1983.]

March 7: NASA officials said emergency surgery on the three leaking engines had been completed. Technicians examined x-rays of the repairs to determine if the work was successful....Challenger's stalled launch schedule got another boost when initial test showed a contaminant discovered on the Shuttle's cargo probably would not pose a problem....NASA said processing of the cargo would continue pending the final outcome of tests, expected in about a week. [Yacenda. TODAY, p. 1A, Mar. 8, 1983.]

March 9: KSC's dress rehearsal for the STS-6 mission went exactly as planned. "Simulated ignition of the Shuttle's main engines came right on time at 1:30 Wednesday (March 9) afternoon, concluding a flawless 16-hour countdown," said a NASA spokesman. STS-6 crewmen - commander Paul Weitz, pilot Karol Bobko, and flight specialists Story Musgrave and Donald Peterson - were on hand for the mock liftoff. NASA said no real problems were encountered during the exercise....[Yacenda. TODAY, pp. 1A & 16A, Mar. 10, 1983.]

March 10: NOAA announced that President Reagan approved a plan to sell the U.S. meteorological satellite and Landsat Earth Resources Satellites to the private sector, with the \$1.5 billion system sold to the highest bidder....The plan was killed in legislation President Reagan signed in December. (see Dec. 19.) ["President Decides to Sell Metsat/Landsat Systems to Private Sector," DEFENSE DAILY, p. 59, Mar. 10, 1983. "Weather Satellites," AVIATION WEEK & SPACE TECHNOLOGY, p. 53, Dec. 19, 1983.]

<> Lt. Gen. James A. Abrahamson, NASA's associate administrator who heads the Shuttle program, said the STS-6 mission will be grounded until "no earlier than the first week of April" while technicians examine and possibly repair the satellite that Challenger will carry.

NASA determined the satellite was contaminated by "particulate matter" - mostly sand and salt - thrown up by storm winds as high as 70 mph that shook the Cape Canaveral launch site February 28.

Abrahamson said no launch date would be set until after the 2 1/2-ton TDRS is removed from Challenger, checked, and, if necessary, cleaned and repaired. [Yacenda. TODAY, p. 1A, Mar. 11, 1983.]

<> The launches of two expendable rockets were postponed from this month until April. The RCA-F mission was rescheduled from March 31 to April 8. Intelsat, originally due for launch on March 17, has been delayed at least till April 7 and, perhaps, April 14. RCA-F had a wiring problem and a mate of Intelsat had a defective switch. [Yacenda. TODAY, p. 10A, Mar. 11, 1983.]

March 14: Kennedy Space Center awarded a \$7,037,785 contract extension to the Martin Marietta Corporation, Michoud Operations (New Orleans, Louisiana) to provide engineering services for the processing of the external tank and its related ground systems equipment at Vandenberg Air Force Base, California. The company will also develop plans for the entire Cryogenic Storage Transfer System used in the Shuttle and for site activation of the ground systems facilities....The cost-plus-award-fee contract runs from March 1, 1983, through September 30, 1984, and brings the total value of Martin Marietta's contract with NASA to \$71,149,883. [Tucker. NASA NEWS RELEASE No. 36-83, Mar. 14, 1983.]

<> KSC workers began wiping down and vacuuming the interior of Challenger's cargo bay to remove sand, salt, dust and other fine debris sprayed into the craft by storm winds February 28....A special technical team also began evaluating the extent of contamination and possible damage sustained by the 2 1/2-ton TDRS that was aboard Challenger when the storm struck....A third work crew continued the electrical and mechanical checks needed to determine whether the Shuttle's three main engines were ready to launch Challenger.... [Yacenda. TODAY, p. 12A, Mar. 15, 1983.]

March 15: Former Boeing technician Barry Nicholson sued Boeing Services International and four of its middle-level supervisors for more than \$5,000 for "malicious interference" in what Nicholson contended should have been his transfer from Boeing to EG&G when the latter became the base operations contractor. Nicholson, 26, a former life

support technician, claims Boeing officials misplaced his position on a seniority list that went to EG&G....
[Thomas. TODAY, p. 2B, Mar. 16, 1983.]

<> Playalinda Beach will continue to be closed to the public because of stepped-up security for military Space Shuttle payloads, Kennedy Space Center Director Richard Smith said in Tallahassee. Smith and Air Force Colonel Maruin Jones, commander of the Eastern Space and Missile Command, were in the state capital to discuss the space program's future with Governor Bob Graham and the Cabinet at a governor's mansion luncheon....[Johnson. TODAY, p. 2B, Mar. 16, 1983.]

March 17: KSC workers finished cleaning particles of sand, salt, dust and other debris on Challenger's TDRS cargo and planned to have the photovoltaic solar panels on the satellite retracted again by midnight on March 18....Workers were expected to begin the final series of leak checks on Challenger's three main engines on the 18th....[Yacenda. TODAY, p. 16A, Mar. 18, 1983.]

March 18: NASA officials announced that April 4 is the new date for Space Shuttle Challenger's inaugural launch....Space agency officials found that contamination of the Tracking and Data Relay Satellite (TDRS) cargo that Challenger will deploy was not as serious as feared. Ed Smylie, NASA's associate administrator for space tracking and data systems, said the hinges, which allow electricity-generating photovoltaic solar panels to extend upon deployment, were cleaned - as was the cargo bay....[Yacenda. TODAY, pp. 1A & 10A, Mar. 19, 1983.]

March 21: The test firing of a "souped-up" version of the Space Shuttle's solid rocket booster motors was a complete success, NASA officials said of the test which took place in Brigham City, Utah, at the Wasatch Division of the Morton Thiokol Corporation. [Yacenda. TODAY, p. 12A, Mar. 22, 1983.]

<> KSC workers checked the electrical connections between Challenger and its satellite cargo. TDRS was returned to the cargo bay on March 19th and NASA spokesman Rocky Raab also said that the Shuttle's main engines "were swung like

bells" in order to assure sufficient clearance existed for steering maneuvers during the five-day STS-6 mission.... The two spacesuits to be used for the first Shuttle spacewalk arrived and a backup suit was expected to arrive from Johnson Space Center on March 22 or 23. [Yacenda. TODAY, p. 12A, Mar. 22, 1983.]

March 22: Behe and Umholtz Electrical Contractors of Orlando, Florida, was awarded a \$1,277,800 fixed-price contract by NASA's John F. Kennedy Space Center. The contract, which runs from March 16, 1983, through October 12, 1983, calls for the LCC's Firing Room 4 and other areas to be modified. [Malone. NASA/KSC NEWS RELEASE No. 39-83, Mar. 22, 1983.]

<> NASA officials identified the substances that were found earlier to be contaminating the TDRS....Edwin Johnson, KSC technical assistant for launch operations, said hydrated silica - particles of Challenger's white tiles - made up 60% of the contamination, followed by smaller quantities of metal chips, salt, sand and an assortment of such other materials as man-made fibers, steel weld beads, and assorted types of paint chips....Johnson said much of the contamination came not only from a late February storm but also from work going on near the TDRS, from chafing of the Orbiter against the seals that were designed to keep dirt out of the cargo bay, and from the length of time the satellite was on the pad. [Yacenda. TODAY, pp. 1A & 18A, Mar. 23, 1983.]

March 23: KSC awarded Reynolds, Smith and Hills (Merritt Island, Florida) a contract extension for the refurbishment of a third Mobile Launcher platform to support the Space Transportation System. The \$917,569 fixed-price contract runs from March 10, 1983, to January 10, 1984. The original contract began October 29, 1982. [Malone. NASA/KSC NEWS RELEASE No. 49-83, Mar. 23, 1983.]

<> Kennedy Space Center awarded Holloway Corporation (Titusville, Florida) a \$61,700 fixed-price contract to modify the existing Utility Control System in the KSC Industrial Area. The contract runs from March 7, 1983, to January 10, 1984. [Malone. NASA/KSC NEWS RELEASE No. 52-83, Mar. 23, 1983.]

<> The six-man crew of the maiden Spacelab mission arrived at KSC to begin two-and-one-half weeks of training for the mission. Crew members include John Young, commander; Brewster Shaw, pilot; mission specialists, Dr. Owen Garriott and Dr. Bob Parker; and payload specialists Byron Lichtenberg and Ulf Merbold, the first European to fly on an American space mission. [Yacenda. TODAY, p. 10A, Mar. 26, 1983.]

March 24: NASA's Kennedy Space Center awarded a \$1,511,000 extension of a current contract to the Federal Systems Division of International Business Machines Corporation (Oswego, New York)....The contract calls for IBM to manufacture and deliver one general purpose computer system for the support of the Air Force Orbiter Functional Simulator at Vandenberg Air Force Base, California, by January 1985....The Orbiter Functional Simulator is the Air Force's version of NASA's Cargo Integration Test Equipment (CITE) facility, which verifies the compatibility of payloads within the Shuttle. [Tucker. NASA/KSC NEWS RELEASE No. 41-83, Mar. 24, 1983.]

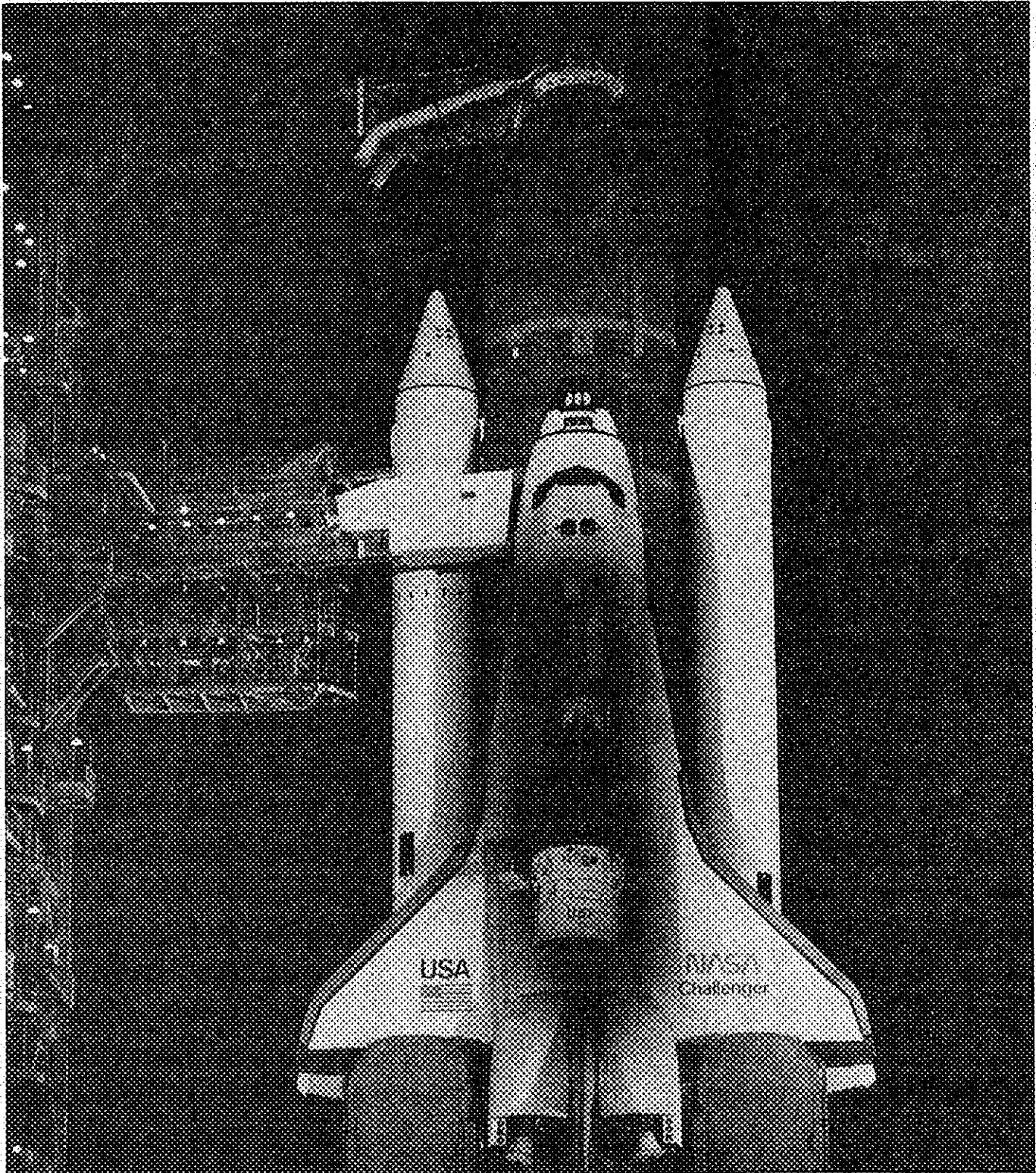
March 25: Ulf Merbold, the first European slated to fly aboard the Space Shuttle, said that the future European cooperation with the United States depends on the success of the Spacelab mission planned for the fall of 1983...."The best thing for Europe is to demonstrate to the public the value of the scientific mission, and that is to make the first Spacelab mission very successful," said Merbold, a German scientist assigned as a payload specialist on the orbiting laboratory's maiden voyage....Merbold said Shuttle delays could jeopardize the Spacelab mission if problems hold up launch and testing of the second in a pair of exotic tracking and data relay satellites the Shuttle will take into space. [Yacenda. TODAY, p. 10A, Mar. 26, 1983.]

March 28: The National Aeronautics and Space Administration announced that complaints from astronauts - and concern over the Federal Privacy Act - prompted a new policy that bars disclosure of sickness unless it threatens a mission. Challenger commander Paul Weitz said, "The specifics of my state of health is privileged information and belongs only between me and my physician until one of us, or both of us, decide it should be otherwise." ["NASA Bags News On Space Sickness," USA TODAY, p. 3A, Mar. 29, 1983.]

March 30: Grumman Technical Services, Inc. was formed by Grumman Corp. to help Lockheed Corporation win the Shuttle processing contract. The new subsidiary was to be based in Titusville, Florida; Fred Haise, former Apollo and Shuttle astronaut, was named president of the new company....George Skurla, president of Grumman Aerospace Corporation, called the race for the processing job "the largest NASA competition of the decade." [Hodges. TODAY, p. 18C, Mar. 31, 1983.]

<> The final countdown for STS-6 began at 2:00 p.m. EST and should run for 93 hours, plus an additional 26 1/2 hours for pre-planned holds....KSC chief spokesman Hugh Harris said the long-awaited countdown began "absolutely right on the second," on time. With the call to stations given by NASA Test Director Frank J. Merlino, more than thirty engineers and technicians manned their stations at the LCC. Launch controllers verified that pre-count tests were completed successfully, and preparations were begun to power-up the Orbiter and ground support systems. Along with contractor representatives, NASA support personnel, and telephone installers, the international press began arriving at the Complex 39 Press Center. Harris said as many as 1500 reporters and camera personnel were expected for the April 4 launch....KSC officials reported that 138 press passes had been issued by 3:50 p.m. March 30th....NASA said that glitch with a computer program that switches power sources for the batteries on the inertial upper stage rocket that will take Challenger's satellite cargo into orbit had been corrected to prevent a recurrence of the problem. [Yacenda. TODAY, pp. 1A & 18A, Mar. 31, 1983.]

March 31: NASA Test Director Frank J. Merlino reported that all preparations of Challenger proceeded "essentially on schedule" as the countdown continued toward the spaceplane's launch, still set for April 4 at 1:30 p.m. EST....A heavy rain began at 4:00 a.m. on the 30th but did not hamper launch teams as they continued readying Challenger, said KSC spokesman Rocky Raab. Early on the 31st, workers began pressurizing fuel and helium tanks on Challenger's orbital maneuvering and reaction control systems. That work was finished and technicians began systems closeout. The orbiter's twin mass memory computer units were checked to ascertain whether the units contain the information they were supposed to hold. [Yacenda. TODAY, pp. 1A & 20A, Apr. 1, 1983.]



Space shuttle Challenger (STS-6) began its maiden voyage at 1:30 p.m. EST on April 4; it carried TRW's Tracking and Data Relay Satellite (TDRS) in its cargo bay as shown in this photograph taken February 3.

APRIL 1983

April 1: The final countdown to the maiden launch of Space Shuttle Challenger - scheduled for April 4 - proceeded flawlessly, but NASA's pre-launch concern shifted from the ground to the high-powered winds whistling through the upper atmosphere above Cape Canaveral. While weather conditions at the Kennedy Space Center were nearly perfect on the 31st, Air Force weather watchers found high-altitude winds at 100 knots (120 mph). Computerized flight simulations conducted by Johnson Space Center in Houston showed that the jet stream winds, 40,000 feet up, could damage the Shuttle's structure.....[Yacenda. TODAY, pp. 1A & 8A, Apr. 2, 1983.]

April 2: Harris Corp. (Melbourne, Florida) won a \$1.2 million contract extension from NASA to manufacture and deliver the orbiter functional simulator at Vandenberg Air Force Base, California, in support of Space Shuttle cargo operations. [Kassak. TODAY, p. 12C, Apr. 2, 1983.]

April 4: A crowd estimated at 500,000 lined Brevard County Beaches and saw Challenger begin its maiden voyage at eight one-hundredths of a second past 1:30 p.m. EST. Smoke from the main engines was visible for forty miles around. Because Challenger's engines were four percent more powerful than Columbia's, the rumble and roar shook the ground more than any previous flight. The launch attracted 1,138 journalists, the smallest press attendance of any of the six Shuttle launches. By comparison, 3,500 journalists covered the launch of Apollo 11. Celebrities in attendance for the STS-6 launch included singer John Denver, author George Plimpton, French astronaut Jean Loup Chretien, Representative Don Fuqua, chairman of the House Science and Technology Committee, and former astronaut General Tom Stafford. [Adams. TODAY, pp. 1A & 14A, Apr. 5, 1983.]

<> High-altitude jet stream winds raging above the Cape Canaveral launch site cooperated by easing up at the last minute to allow Challenger to launch on time. The winds, which dropped from 160 mph to a more tolerable 100 mph, almost caused postponement of the launch. NASA Launch Director Al O'Hara said instruments detected no fuel leaks at all in Challenger's engine compartment during launch. At one point just seconds after liftoff, Mission Control in

Houston reported Challenger taking a slightly lower trajectory than planned; the problem was considered insignificant, and Challenger adjusted course before continuing its upward trajectory. STS-6 was the first to use a new lightweight external fuel tank and also had new lightweight solid rocket boosters. NASA reported the boosters were located quickly and appeared to be in good shape. USBI's recovery ships retrieved the boosters at about 2:15 p.m. EST. [Yacenda. TODAY, pp. 1A & 14A, Apr. 5, 1983.]

April 5: United Space Boosters, Inc.'s shuttle refurbishing operation will stay in Brevard County, according to U.S. Representative Bill Nelson (D-Melbourne). "We have great news. The 700 jobs at USBI will remain in Brevard. NASA Administrator James Beggs just called me. The decision today was Kennedy Space Center versus Huntsville." He said Beggs told him the USBI solid rocket booster manufacturing activity "will remain at KSC or nearby." ["USBI Jobs Stay Here," THE TRIBUNE, p. 1A, Apr. 6, 1983.]

<> The shuttle's launch pad sustained comparatively little damage from the liftoff of STS-6. KSC officials credited an ongoing program to "harden" the concrete and steel structure. Sgt. Wayne Ranow, a U.S. Air Force launch pad operations manager, said only about 10 electrical boxes had been damaged compared to a high of 25 on earlier launches. Ranow also said none of the four-inch thick bricks that pave the pad were shattered by the rocket thrust. During the first two launches as many as 100 such bricks were hurled 1500 feet into fences. After STS-2, a solid coat of concrete was poured over the area directly under the rocket flame to keep the bricks in place. [Adams. TODAY, p. 10A, Apr. 6, 1983.]

<> Challenger's two 93-ton booster rockets were returned to a Cape Canaveral Air Force Station hangar and USBI reported that they would be used again in early and mid-1984. "They are in excellent shape. It was a model recovery," said Paul Burton, USBI spokesman. The rockets were recovered 188 miles offshore one half-hour after liftoff. Parts of these rockets were used during STS-1 in April, 1981, and the parachutes were used in November, 1981, for STS-2. [Adams. TODAY, p. 16A, Apr. 6, 1983.]

April 7: County Civil Defense Director Jim Adkins asked Brevard's county commissioners to seek federal money on behalf of the county and municipalities to offset the cost of providing emergency services during shuttle launches. The county and its cities now spend between \$20,000 and \$25,000 in emergency services per launch. The request for money would be sent to U.S. Rep. Bill Nelson who would be asked to submit it to the appropriate federal agency. [Holmes. TODAY, p. 1B, Apr. 8, 1983.]

<> NASA's KSC awarded Zero Corporation (Monson, Massachusetts) a contract for aluminum racks that support electronic equipment used in Launch Processing Systems for the Space Shuttle. The racks are due to be delivered by September 7, 1983. [Malone. NASA/KSC NEWS RELEASE No. 85-83, Apr. 26, 1983.]

April 11: SATCOM 1R was launched just after 5:39 p.m. EST aboard Delta 3924 from launch pad 17B. The RCA satellite was the second of the company's advanced solid state satellites and would act as an "in-orbit spare" for other protected services, such as cablenet services and the SATCOM 5 satellite launched in October 1982 to provide Alaskans with improved long-distance telephone and television service. [Sharn. TODAY, p. 10A, Apr. 12, 1983.]

April 14: KSC officials announced that NASA had approved a \$250,000 study to determine the feasibility of constructing an estimated \$100 million energy plant that would furnish the Shuttle with liquid hydrogen and gaseous nitrogen. The plant - using a revolutionary process called polygeneration - would replace the expensive natural gas now used to develop Shuttle fuel with more plentiful and less expensive coal. As a side benefit, heat produced during the manufacturing of Shuttle fuel could be turned into electricity for use throughout the space center. The low cost energy could save as much as \$1 million per shuttle launch, said Peter Minderman, KSC's director of engineering development. [Cone. TODAY, pp. 1A & 16A, Apr. 15, 1983.]

April 16: The Spaceweek Information and Work Center, sponsored by the Canaveral Council of Technical Societies and the Spacecoast Chapter of the L-5 Society, opened in the Searstown Mall on U.S. 1 in Titusville, Florida. ["Space Boosters Open Center for Public," TODAY, p. 3B, Apr. 20, 1983.]

<> Challenger, described as the "cleanest" spacecraft to return from space, arrived at the Kennedy Space Center at 12:45 p.m. EST, riding atop a 747 jet. The mated pair of planes approached the Space Center from the south, flew over the runway once and circled back over the Indian River. At KSC, about 2,000 tourists and KSC workers and their families saw the landing from close-up. Challenger was then demated and towed to the orbiter processing facility. NASA spokesman Mark Hess said Challenger not only was cleaner in appearance, but also encountered fewer problems than was the case with Columbia. [Baird. THE TRIBUNE, p. 3A, Apr. 20, 1983.]

April 17: Challenger was wheeled into its quarters at the Orbiter Processing Facility and NASA officials said preparations for the seventh Shuttle mission had already begun. ["Challenger Wheels In for Spring Cleaning," TODAY, p. 12A, Apr. 18, 1983.]

April 19: With the deadline for saving Kennedy Space Center's last remaining Apollo-era launch tower just days away, six national and Florida groups hoping to preserve the historic structure took NASA into court. Led by the National Trust for Historic Preservation, the groups filed suit in U.S. District Court in Washington, D.C., seeking a temporary restraining order blocking the space agency from proceeding with plans to demolish the tower. [Yacenda. TODAY, p. 1B, Apr. 20, 1983.]

April 20: Assistant Attorney General Robert Seldon, representing NASA, told U.S. Magistrate Louis Oberdorfer that no action would be taken to demolish the last surviving Apollo-era launch tower at KSC until the preservationists had their day in court on May 9. Based on NASA's assurances, preservationists withheld their planned request for an injunction. In Congress, U.S. Rep. Bill Nelson predicted that funding would be approved to enable NASA to preserve the tower. [Yacenda. TODAY, p. 1B, Apr. 21, 1983.]

April 22: The Shuttle Pallet Satellite (SPAS-01) was unveiled at Kennedy Space Center. The \$13 million spacecraft was built in West Germany by the firm of Messerschmitt-Bolkow-Bkohn GmbH (MBB). SPAS-01 is essentially a platform for

holding interchangeable experiments and will be the first recoverable "free-flier" to be carried aboard the Shuttle. It will be deployed in June from STS-7. [Yacenda. TODAY, p. 1A, Apr. 23, 1983.]

April 25: The launch of shuttle mission 6 marked the first reuse of Morton Thiokol solid rocket motor hardware flown on earlier shuttle flights, a cost-saving program goal. Booster hardware added to the motors by United Space Boosters, Inc. to complete the power plants, also was reflowed for the first time during the space shuttle program. The reuse of several tons of previously flown booster hardware saved over a million dollars in Mission 6 launch costs, according to Thiokol. Additional minor components that had been part of earlier ground test motor firings at Thiokol in Utah also were flown on the mission boosters. This hardware came primarily from the first and second qualification motor firings that occurred in June and September, 1979, respectively. Similar ground test hardware also had flown some previous missions. ["Shuttle 6 Reused Solid Motor Hardware," AVIATION WEEK & SPACE TECHNOLOGY, p. 116, Apr. 25, 1983.]

<> NASA's Aerospace Safety Advisory Panel recommended a shuttle engine redesign for 109% operations - a requirement for many Vandenberg AFB launches. The panel said: "There is a growing body of opinion that the origin of the problems of the (engine turbomachinery) is of a 'systems' nature rather than a set of discrete component difficulties. It would seem prudent, therefore, to undertake a major redesign of the turbopumps as the long-range solution to the problems...." ["NASA to Seek Redesign of Shuttle Engine Parts," AVIATION WEEK & SPACE TECHNOLOGY, p. 115, Apr. 25, 1983.]

<> David Boland, Inc., Titusville-based general contractor, started work on new facilities for the U.S. Fish and Wildlife Service, Merritt Island Wildlife Refuge. The \$1,119,000 project includes a new headquarters building and new maintenance facilities. Stephen Gard, assistant refuge manager, said the headquarters building will include offices, a visitors contact station, a wildlife exhibit, a small auditorium that seats about 30, and possibly a boardwalk and rail trail around the complex. Four new maintenance buildings will also be built: a warehouse, carpentry shop, filling station and vehicle storage facility. The current headquarters facilities were homes

left on the refuge when NASA purchased the property, Gard said. ["Contractor Begins \$1 Million Project For Wildlife Service," THE TRIBUNE, p. 5A, Apr. 27, 1983.]

April 26: Kennedy Space Center awarded Reynolds, Smith and Hills (Merritt Island, Florida) an extension on its fixed-price contract for \$269,000. The contract, which runs from March 10, 1983, through December 10, 1983, is for architectural and engineering services connected with a review of the disassembly drawings and surveillance of stripping and the disassembly of an Apollo Mobile Launcher to be modified for use in the Space Shuttle program. [Malone. NASA/KSC NEWS RELEASE No. 84-83, Apr. 26, 1983.]

April 27: NASA awarded a \$123,983 contract extension as a joint venture to Planning Research Corp. with Briel, Rhame, Poynter and Houser (Cocoa Beach, Florida) for architectural services on facility modifications for the Shuttle/Centaur upper stage vehicle at KSC. [Kassak. TODAY, p. 16C, Apr. 27, 1983.]

<> Hollaway Corp. (Titusville, Florida) won a \$1.3 million contract from NASA to modify solid rocket booster refurbishment facilities in the Vehicle Assembly Building and Hangar N at Cape Canaveral Air Force Station. [Kassak. TODAY, p. 16C, Apr. 27, 1983.]

<> Two men who were in the Orbiter Processing Facility (OPF) at Kennedy Space Center during a leak of highly toxic hydrazine rocket fuel on April 17 returned to a Titusville, Florida, hospital suffering from respiratory problems. Both men - photographer Alex Bosmeny, 61, and firefighter Vernon Woodard, 32 - said on April 26 that no alarm had sounded after the spill, thereby increasing their exposure to the harmful gas. KSC spokesman Hugh Harris said it was possible the high bay where the leak occurred was cleared by word of mouth rather than by an announcement over the public address system. He also said that there was as yet no evidence that the two men had been injured by hydrazine. Harris said, further, that a KSC committee had been formed to investigate the incident. Area Occupational Safety and Health Administration Director Bill Demery said that OSHA would investigate as well. [Sharn. TODAY, pp. 1B & 3B, Apr. 27, 1983.]

<> Astronauts Bob Overmyer and Bill Lenoir, who flew on STS-5, called on the United States to establish a permanent manned space station. Speaking at the 20th Annual Space Congress in Cocoa Beach, Florida, Overmyer speculated that a civilian-military "joint-use" space facility was feasible and Lenoir said that he thought commercial demands would eventually bring about the establishment of a space station. [Yacenda. TODAY, p. 20A, Apr. 28, 1983.]

April 28: John Hodge, director of NASA's Space Station Task Force told the final session of the 20th Annual Space Congress that the "gee-whiz" period of space exploration is yielding to a time of commercial space exploitation. "We've got to get used to the idea that we're going to do lots of things in space," Hodge told the Cocoa Beach, Florida, gathering of space experts and enthusiasts. The need for affordable space systems will require NASA to change the way the agency does business, Hodge remarked. "Whatever it is that we're going to be doing, it has to be customer-driven," he said. [Yacenda. TODAY, p. 2B, Apr. 29, 1983.]

<> Isaac Gillam IV, head of the plans and policy section of NASA's Office of Space Flight, told the 20th Annual Space Congress in Cocoa Beach, Florida, that current agency plans call for launching a space station in 1991. Congressional attention directed toward NASA's space station study has led, Gillam said, to "an air of cautious optimism" that Congress will fund a space station project; actual work on the project could begin in 1986. [Yacenda. TODAY, p. 2B, Apr. 29, 1983.]

MAY 1983

May 2: A 41 1/2-minute test firing of NASA's sophisticated new Tracking and Data Relay Satellite indicated to project engineers the spacecraft could be successfully maneuvered to a proper geosynchronous orbit. [Yacenda. TODAY, p. 1A, May 3, 1983.]

May 3: Routine testing of Challenger's electrical system began in anticipation of a mid-June launch. Also begun were checks of the electrical systems of Challenger's four major payloads and tests to assure compatibility of those systems with that of the Orbiter. NASA anticipated loading cargoes aboard Challenger later in May. [Yacenda. TODAY, p. 20A, May 4, 1983.]

May 4: Twelve central Brevard students were selected to participate in NASA's Nurture program: Cameron Vigil, Garry Rooney and Tracy Thompson (Rockledge High School); Chris Beadle, Amy Howald, Jennifer Woolbright and Ronda Carman (Cocoa High School); Dana Weaber (Cocoa Beach High School); and Michelle Portera, Steve Davis, Arthur Johnson, Jr., and Chung Kim (Jefferson Junior High on Merritt Island). The students will make routine visits to Kennedy Space Center during their last three years of high school and will gain hands-on experience in specific and preferred fields of science. ["NASA Nurtures Local Students," THE TRIBUNE, p. 7A, May 4, 1983.]

<> Harris Corp.'s Government Systems Division (Melbourne, Florida) was awarded a \$1,245,107 fixed-price contract extension by NASA to manufacture and deliver three separate pieces of equipment in support of the Orbiter Functional Simulator at Vandenberg Air Force Base, California, by August 1, 1984. ["Harris Wins Shuttle Contract," THE TRIBUNE, p. 5A, May 4, 1983.]

<> Martin Marietta formed a subsidiary company to perform launch services for the space shuttle program, the corporation announced. The new firm, Martin Marietta Launch Services Corp., would operate at both Kennedy Space Center and Vandenberg Air Force Base, California, and would employ

over a thousand persons. Martin Marietta is a member of the Rockwell International team which is competing against a Lockheed-led team for the shuttle processing contract. ["Martin Marietta Forms Shuttle Firm," TODAY, p. 20C, May 5, 1983.]

- <> Technicians continued checking out a new Ku-band antenna installed on Challenger, (expected to launch June 15). The new antenna would allow the crew to communicate with the ground via NASA's sophisticated TDRS system and would also be used as a radar antenna for other orbiting satellites. KSC spokesman Jim Ball said technicians were able to shave a day off the allotted time for testing the electronic systems of three of Challenger's payloads for the upcoming STS-7 mission. Preparations for Challenger's fourth major cargo, the OSTA-2 onboard experimental payload, continued at the space center's Operations and Checkout Building. [Yacenda. TODAY, p. 20A, May 5, 1983.]

May 5: Astronauts Sally Ride, John Fabian and Anna Fisher took part in mission simulation exercises on the ground at Kennedy Space Center. The exercises simulated what Ride and Fabian would do to prepare one of Challenger's three major payloads for deployment during the orbiter's second-flight in mid-June. They would release Canadian and Indonesian communication satellites and operate experiments on a West German scientific pallet. Although the instruments used for the simulations were similar to those that the astronauts would encounter on the shuttle, some improvisations took place; music stands were used to hold program manuals and a sheet of foam rubber was taped up to keep glare from the astronauts' eyes. The astronauts seemed to be in good spirits during the simulations, their jokes eliciting frequent, if restrained, laughter. [Yacenda. TODAY, p. 18A, May 6, 1983.]

- <> NASA's Kennedy Space Center awarded Godfrey Manufacturing, Inc. (Oldsmar, Florida) a contract to manufacture and deliver strobe lights for Shuttle Landing Facilities at Kennedy Space Center, Florida, Dryden Flight Research Facility, California, and White Sands Missile Range, New Mexico. The firm-fixed-price contract was initiated on April 22, 1983, and the lights are to be delivered by June 1983. The contract has a dollar value of \$27,100 and is one set aside for award to a small business firm. [Malone. NASA/KSC NEWS RELEASE No. 93-83, May 5, 1983.]

May 5: NASA announced it would display the space shuttle orbiter Enterprise, the non-flying shuttle, at the Paris Air Show May 26 - June 5, where it will be the keystone of the U.S. aerospace exhibit. [DEFENSE DAILY, p. 32, May 5, 1983.]

<> NASA Administrator James Beggs said NASA had not made a final decision on whether to launch the second TDRS satellite aboard the STS-8 mission in August but that he is "somewhat pessimistic" that it can be included on the mission because of the time needed to correct the problem with the Inertial Upper Stage, which caused the TDRS-1 to go into improper orbit. [DEFENSE DAILY, p. 30, May 5, 1983.]

<> "These hearings represent a significant milestone in this nation's space program. They are noteworthy in that the question being addressed today is no longer whether space has commercial promise but rather how best to proceed to maximize that promise for national economic well-being," said NASA Administrator James M. Beggs, at a hearing by the House Subcommittee on Space Science & Applications on commercial activities in space. [DEFENSE DAILY, p. 30, May 5, 1983.]

<> Twenty-two years ago Alan B. Shepard, Jr. became the first American astronaut to be launched into space. Shepard's Freedom 7 Mercury was launched aboard a Redstone rocket at 9:34 a.m. EST from Cape Canaveral. Freedom 7 is now on permanent display at the Smithsonian Institution in Washington, D.C. Today, Shepard is a successful businessman in Houston, Texas; he has interests in real estate and beer distribution. [Yacenda. TODAY, pp.1A & 20A, May 5, 1983.]

May 6: NASA's John F. Kennedy Space Center chose three central Florida firms for special recognition during the center's observance of Small Business Week from May 9 through May 13. Awards were presented by KSC Director Richard G. Smith to Greer Electrical Contractors (Rockledge) New World Services, Inc. (Orlando) and BAMSI (Titusville, Florida). Greer was chosen as the "Small Business Prime Contractor of the Year;" NWSI was recognized as the "Woman-Owned Business Contractor of the Year;" and BAMSI was recognized as the "Minority Business Contractor of the Year." [Malone. NASA/KSC NEWS RELEASE No. 94-83, May 6, 1983.]

May 9: Kennedy Space Center awarded a \$39,247 fixed-price contract to Vic Lane Construction, Inc. (Merritt Island, Florida). The contract, for modifications to the hazardous waste treatment facility at KSC's fire training area, is one set aside for a small business firm. [Tucker. NASA/KSC NEWS RELEASE No. 92-83, May 5, 1983.]

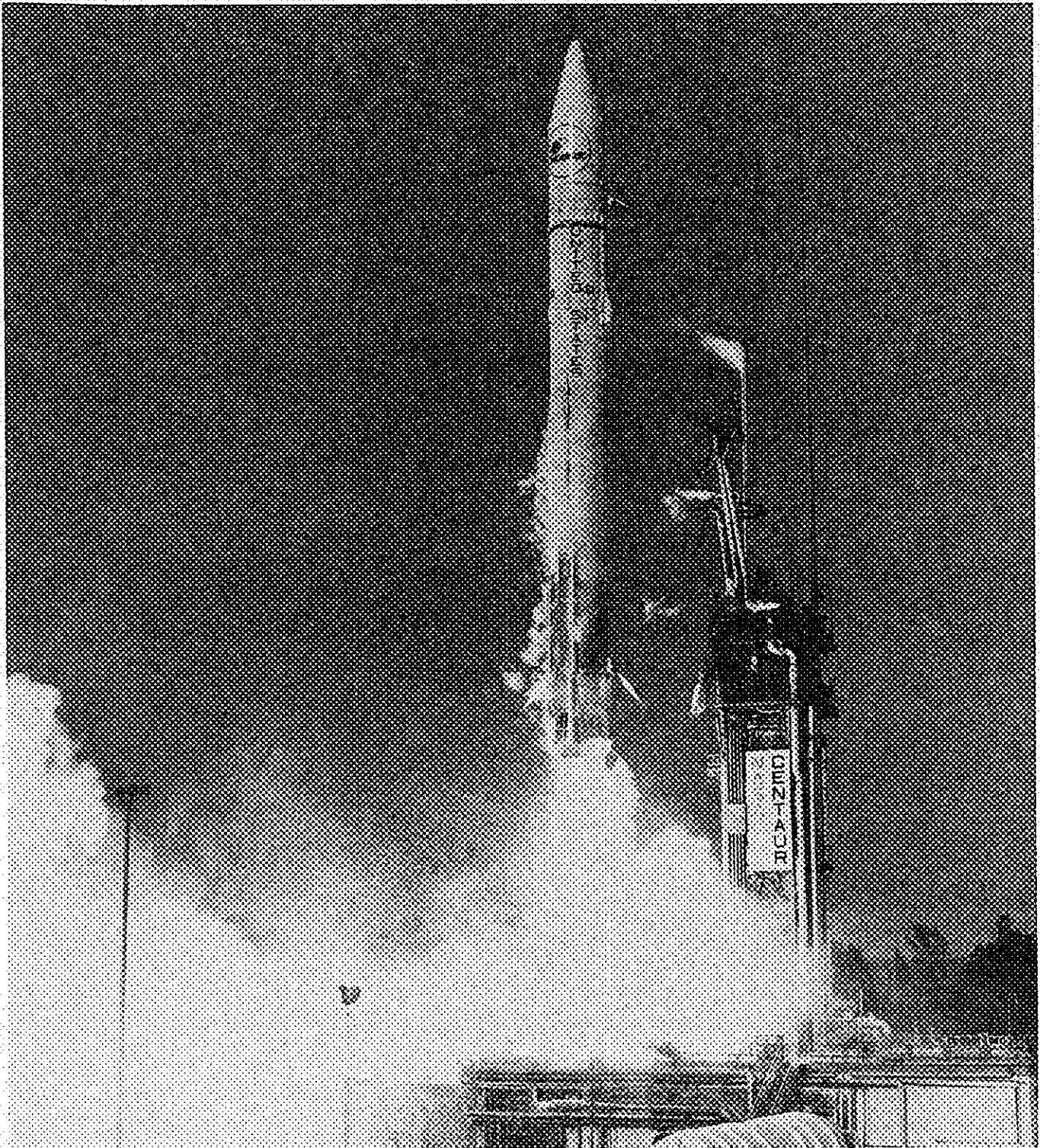
<> Harold and Patricia Lamb and their two daughters Jennifer and Joni were recognized as the 19 millionth visitors to the space center. The family - from Rouseville, Pennsylvania - was treated to lunch, a personal tour of the visitors center, a bus tour of the spaceport, and framed photographs of the shuttle taking off, landing, and resting atop its 747 carrier jet. [Yacenda. TODAY, p. 3B, May 10, 1983.]

May 10: NASA announced that the launch of STS-7 would occur at 7:33 a.m. EST on June 18, 1983, 63 calendar days of processing time since the return of Challenger on the STS-6 mission. STS-7 was expected to land at KSC between 6:58 and 7:46 a.m. EST on the morning of June 24, 1983. The crew will include Bob Crippen, Fred Hauck, Sally Ride, John Fabian and Dr. Norman Thagard. [Yacenda. TODAY, pp. 1A & 12A, May 11, 1983.]

May 11: Avtec, Inc. (Titusville, Florida) headed by Harry Merritt, Jr., was awarded a contract with EG&G Florida, Inc., to refurbish the hydrocarbon fuel storage tank at Kennedy Space Center. The \$14,007 contract began March 29, 1983. ["Avtec Wins EG&G Contract," THE TRIBUNE, p. 5A, May 11, 1983.]

May 12: NASA decided to evaluate two alternative "payload-of-opportunity" carriers for the space shuttle, which would be used to carry a wide variety of payloads into space at quick notice and low cost, and be able to be reflown within six months; the program was designated "Hitchhiker." ["NASA Evaluating Two 'Hitchhiker' Carriers for Shuttle," DEFENSE DAILY, p. 70, May 12, 1983.]

May 16: President Reagan announced the government would allow commercial firms to buy Delta, Atlas and Titan rockets and launch them from existing pads to encourage private enterprise in space. The move comes as the government



On May 19, 1983, this Atlas Centaur became the last rocket launched from Complex 36B. Its cargo was an INTELSAT V; liftoff came at 6:26 p.m. EDT.

phases out use of such unmanned rockets - called Expendable Launch Vehicles, or ELV's - in favor of the Space Shuttle. ["U.S. Rockets to Go Commercial," TODAY, p. 10A, May 17, 1983.]

May 17: NASA announced that the new refurbishment plant for the shuttle's solid rocket boosters would be built on Kennedy Space Center property. The exact location of the new facility was not announced, but NASA did say it would accept bids for a contract to erect the plant. [Dickerson. TODAY, p. 1A, May 18, 1983.]

<> Apollo 7 astronaut Walt Cunningham returned to Kennedy Space Center for the first time since he left the astronaut corps twelve years ago. Cunningham, author of the 1977 book The All-American Boys, had helped investigate the Apollo 204 fire of January 27, 1967, and had headed part of the Skylab program in its early years until he was replaced by astronaut Pete Conrad. Cunningham was in the area to speak to a group of French automobile (Renault) executives at the Cocoa Beach Holiday Inn. He now heads his own investment company - The Capital Group - in Houston. [Yacenda. TODAY, pp. 1B & 3B, May 19, 1983.]

May 19: NASA Associate Administrator Lt. Gen. James Abrahamson said the agency is working with Space Transportation Co. to get a proper proposal from the company to privately fund construction of a fifth shuttle orbiter in exchange for the marketing rights to the orbiter's payload capacity. SpaceTran offered to pay \$1 billion in 1982 dollars to build a fifth orbiter, but won't pay for additive costs needed to maintain the orbiter's production base.... ["NASA/Spacetrans Defining Principles for 5th Orbiter Proposal," DEFENSE DAILY, p. 109, May 19, 1983.]

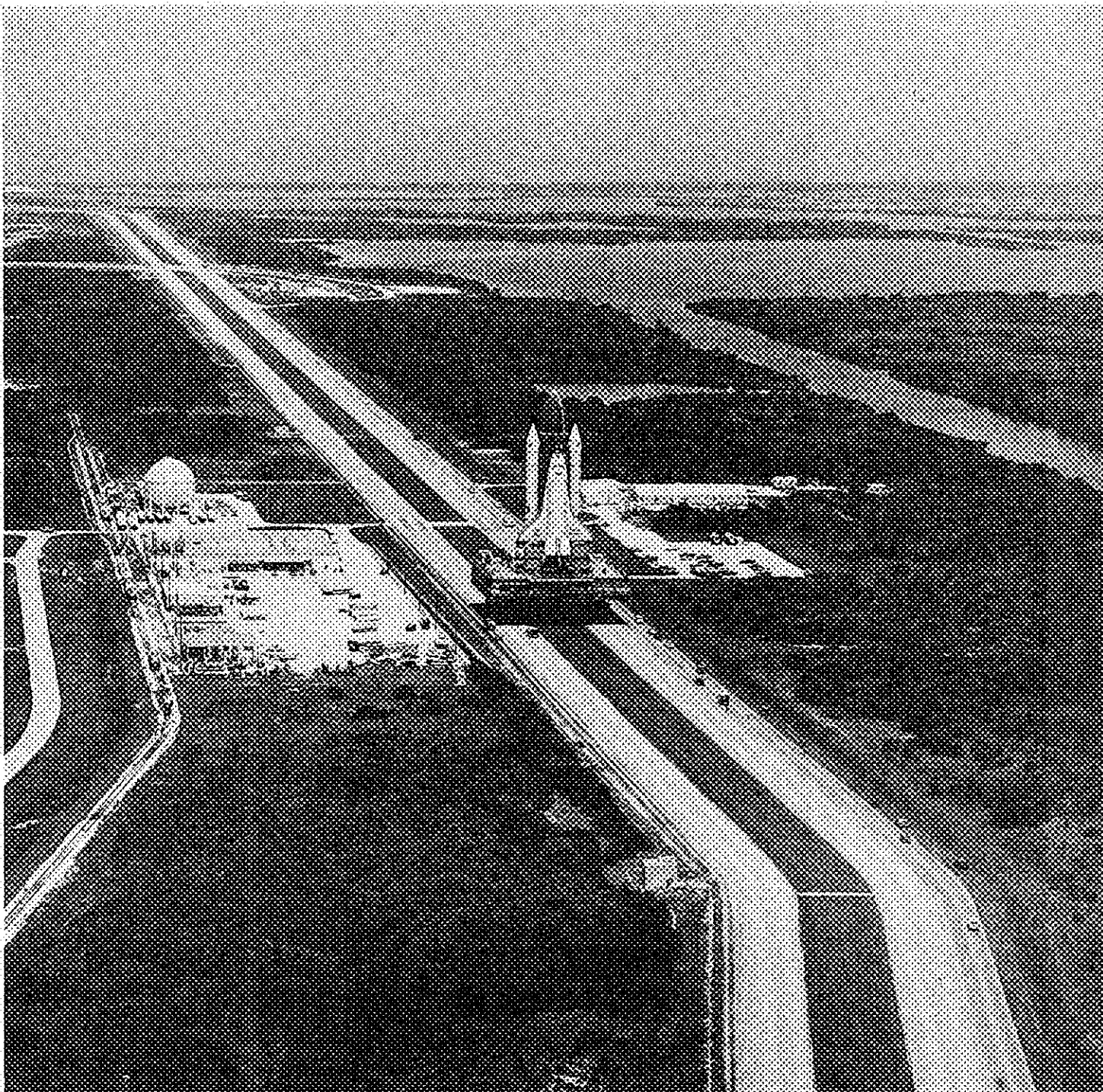
<> Cape Canaveral's Launch Complex 36B was given a rousing send-off into history as an Atlas Centaur rocket and its communication satellite cargo roared spaceward at 6:26 p.m. EDT. The launch...was the last one for the launch site, in service since the Surveyor program began sending probes to the moon 17 years ago. A sister pad at the Cape Canaveral Air Force Station complex - 36A - will remain active, but 36B will be converted to a processing facility for Centaur upper-stage rockets to be used for deploying satellites from aboard the space shuttle, KSC spokesman Dick Young said.

Atop the Atlas Centaur was an INTELSAT 5 satellite, destined to carry heavy telecommunication traffic across the Atlantic between Europe and North America. [Yacenda. TODAY, p. 14A, May 20, 1983.]

May 21: Technicians backed the Challenger from the Orbiter Processing Facility at 1:05 p.m. EST. Pulled behind a tractor at what NASA spokesman Mark Hess termed "a brisk walking pace," the 75-ton spaceplane was inside the Vehicle Assembly Building twenty minutes later. This was the shortest time yet a space shuttle has spent being readied for flight inside the orbiter facility: 35 days. Challenger was first slated to depart the OPF at midnight on the 19th, but the move was delayed at least four times over the intervening 37 hours as workers bonded new thermal insulation blankets and applied gap-filling compounds between the tiles on the craft's maneuvering pods....Once the orbiter was inside the VAB, technicians began attaching a large, rectangular support arm to the craft. That arm is used to raise the DC-9-sized craft 190 feet into a high bay for mating the Challenger to its massive external fuel tank. [Yacenda. TODAY, p. 20A, May 23, 1983.]

May 22: The Reagan Administration's latest space policy initiative could bring half a dozen U.S. companies into competition with the government in the business of launching commercial satellites into orbit. The directive issued last week by President Reagan authorizes the sale to private industry of parts and plans for the government's Delta, Atlas and Titan rockets. These are the one-shot boosters that formed the backbone of the U.S. space fleet before the development of the reusable space shuttle. Reagan also would allow companies to lease facilities at Kennedy Space Center to launch their rockets. Several companies have long been interested in offering private launches of communications and remote-sensing satellites, but have been hampered by federal reticence and red tape....[Shapiro. TODAY, pp. 1A & 20A, May 22, 1983.]

May 25: Kennedy Space Center awarded Reynolds, Smith and Hills (Merritt Island, Florida) a contract extension for architectural and engineering work connected with the review of the disassembly drawings and surveillance of stripping and the disassembly of an Apollo Mobile Launcher to be modified for use in the shuttle program. The fixed-price contract has a value of \$269,000, which brings the total



Challenger's May 26 rollout from the VAB marked the start of its historic STS-7 mission on which Sally Ride became the first American woman sent into space.

will extend to December 10, 1983. ["KSC Awards Contract Extension," THE TRIBUNE, p. 6A, May 25, 1983.]

May 26: Challenger traveled from the VAB to its launch pad three and a half miles away. The journey was begun at 12:30 p.m. EST and ended at 7:30 p.m. EST when the shuttle arrived at pad 39A and was set firmly in place. Workers began checking the connections that carry propellants, gases, electricity and data to the shuttle from the ground. NASA Launch Director Al O'Hara said that one significant problem uncovered prior to Challenger's departure from the VAB should not delay the launch schedule. The glitch involved links between the orbiter and one of the twin solid rocket boosters attached to the shuttle's external fuel tank. The 7:33 a.m. EST June 18 launch was not considered in jeopardy. [Yacenda. TODAY, pp. 1A & 16A, May 27, 1983.]

May 27: It's finally official. The Apollo-era launch tower threatened with demolition has gotten a new lease on life. "It's official as official can be that NASA is saving the tower," said Ian Spatz, counsel for the National Trust for Historic Preservation. The National Trust and five other preservation groups that filed suit to block NASA from destroying the 19-year-old tower reached an agreement with the space agency that was presented in court and which keeps the tower off the scrap heap. Under the terms of the agreement, the tower will be disassembled so pieces can be preserved, stored and later re-erected on another site as an historical monument....[Yacenda. TODAY, p. 1B, May 28, 1983.]

May 28: David Boland, Inc. (Titusville, Florida) was awarded a \$500,000 TWA Services contract to convert the souvenir sales building at KSC's Visitors Information Center into a food service facility. [Kassak. TODAY, p. 16C, May 28, 1983.]

May 29: NASA announced that it was scratching the second in a series of Tracking and Data Relay Satellites planned for launch aboard the space shuttle in late summer. An Air Force-developed booster rocket sent the first satellite or TDRS off course following deployment from Challenger in April. A joint NASA-Air Force investigation board set up to look into the incident has yet to conclude what caused the problem. [Yacenda. TODAY, p. 1A, May 29, 1983.]

May 30: NASA announced plans to recompile the job of refurbishing recovered non-motor parts of solid rocket boosters and assembling complete boosters. The winner would be required to build a new refurbishment facility on the grounds of the center. The job is now being done by United Space Boosters, Inc., a United Technologies subsidiary, in the low bay area of the Vehicle Assembly Building and at several other locations at Cape Canaveral Air Force Station. Morton Thiokol refurbishes and reloads motor segments in Brigham City, Utah, under a separate contract. The recovery operation and operation of the vessels Liberty and Freedom will remain a United Space Boosters responsibility. ["NASA to Recompete Booster Refurbishment," AVIATION WEEK & SPACE TECHNOLOGY, p. 297, May 30, 1983.]

JUNE 1983

June 1: Following a lunch with President Reagan in Washington, the STS-7 crew flew to Kennedy Space Center for the next stage in their preflight preparations. Mission commander Bob Crippen and flight pilot Frederick Hauck were scheduled to fly simulated shuttle landings at the spaceport's 3-mile-long Shuttle Landing Facility (SLF). Following that exercise, they would be joined by fellow crewmembers John Fabian, Sally Ride and Norman Thagard to check out flight equipment. [Yacenda. TODAY, p. 16A, Jun. 2, 1983.]

June 6: Orlando International Airport was considered as a future space shuttle alternate landing facility in the event bad weather closes the KSC shuttle runway after an orbiter reentry has started toward the launch site. ["Shuttle Officials Study Orlando as Alternate Landing Facility," AVIATION WEEK & SPACE TECHNOLOGY, p. 78, Jun. 6, 1983.]

June 8: The International Brotherhood of Electrical Workers threatened to walk out on KSC contractors RCA and EG&G. The union represents 300 RCA workers and 40 with EG&G. A federal mediator was called into the talks at the Cocoa Beach Holiday Inn. [Adams. TODAY, p. 1B, Jun. 9, 1983.]

June 13: Pioneer 10 slipped out of the solar system, destined to wander in space forever. The spacecraft was launched more than 11 years ago to observe the planets and, as it left the solar system, most of its systems continued to function. [Associated Press. TODAY, p. 4A, Jun. 19, 1983.]

<> As preparations proceeded for the shuttle's seventh mission, NASA announced that it would probably have to cancel the STS-10 mission set for November because its military payload was not going to be ready. "The Air Force is not going to fly that mission, so we are just scrubbing it," said spokesman David Garrett at NASA's Washington, D.C., headquarters. He said negotiations were under way between the Air Force and NASA to arrange a new flight schedule for the delayed cargo. Under an agreement with NASA, the Air Force has the right to pre-empt non-defense cargos on the shuttle for its own payloads. [Yacenda. TODAY, pp. 1A & 12A, Jun. 14, 1983.]

<> A mechanical failure in the second stage control mechanism on an Air Force-developed upper-stage rocket caused a sophisticated communication satellite to go astray after launch from the Space Shuttle in April, said Air Force Space Division spokesman Col. Jeff Baker. The Los Angeles-based Col. Baker said work was already under way to assure the problem does not recur on similar inertial upper stage (IUS) rockets under construction for future flights. "There have been reports that everything is on hold for the IUS and that's not true," Baker said. [Yacenda. TODAY, p. 12, Jun. 14, 1983.]

June 15: Challenger's flight crew arrived at Kennedy Space Center and expressed their readiness for June 18th's planned 7:33 a.m. EDT launch of the space shuttle. Meanwhile, launch crews were set for the call to stations, scheduled to be made at 3 a.m. EDT, June 16, kicking off the final countdown. Flying into the three-mile-long Shuttle Landing Facility (SLF) runway at about 5:40 p.m. EDT, the five-person STS-7 crew - consisting of commander Bob Crippen, pilot Rick Hauck, and mission specialists Sally Ride, John Fabian, and Norman Thagard - was greeted at the spaceport by a contingent of media representatives and NASA personnel. The crew had few words for the greeters. "We're ready to go on Saturday," Crippen reassured reporters. "Sure thank you for coming out," was the brief comment from Ride, who will be the first American woman to fly in space. Weather-watchers predicted good conditions for the launch - low, scattered clouds in the 2,000-foot to 6,500-foot altitude range, light and variable winds, temperatures around 73, and no thunderstorms expected - according to Air Force spokesman Don Engel. For about two hours after dark, workers practiced a simulated rescue operation on the KSC runway using the mock Shuttle cabin built for such tests. [Yacenda. TODAY, pp. 1A & 20A, Jun. 16, 1983.]

June 16: Challenger's five-astronaut crew spent the day brushing up on mission skills prior to their launch on the 18th. Beginning at 5:00 a.m. EST, the crew spent the first part of the morning checking their flight equipment for fit and reviewing mission information. While they were doing that, their skipper, mission commander Bob Crippen, was out in a modified Gulfstream jet aircraft flying simulated Shuttle approaches to the SLF. Later in the morning, Crippen and his crew took turns zipping around in the sleek T-38 jets the astronauts fly.

On the mechanical side of things, a last-minute computer glitch involved one of two devices called Master Events Controllers (MECs) located aboard Challenger. The devices, among other functions, relay commands from the Orbiter's general purpose computers to explosive devices that separate the huge external fuel tank and the twin solid rocket boosters from the shuttle during flight. The affected MEC was a backup device, but the function it supports is critical to the safety of the flight crew. After clearing the computer logic in the device and successfully running a series of test simulations, engineers from both NASA and Rockwell International, which built the device, decided the problem was related on to the initial powering of the box and had been resolved. The suspected problem with the electrical controller "...will be no problem at all," KSC spokesman Rocky Raab said.

Further, the payload bay doors were opened so that engineers could verify that proper electrical connections were made between the orbiter and the McDonnell Douglas-built Payload Assist Module (PAM) booster rockets that will transport two communications satellites into geosynchronous orbit after leaving the shuttle.

The International Brotherhood of Electrical Workers planned to picket against EG&G, the space center's main ground support contractor, but KSC labor relations chief Hal Gooch said a walkout by the approximately 40 computer operators and data processors would have no effect on the launch.... [Yacenda. TODAY, pp. 1A & 20A, Jun. 17, 1983.]

June 17: About two dozen electrical union picketers stood along Kennedy Space Center entrance roads saying they were protesting their inability to negotiate with EG&G Inc., KSC's base operations contractor. Bill Hamilton, business manager of the International Brotherhood of Electrical Workers Local 2088, said attempts since April to reach agreement on a new contract have failed. The union plans to continue the informational pickets for as long as necessary, he said. Hamilton would not comment on the possibility of a strike. [Dickerson. TODAY, p. 3B, Jun. 18, 1983.]

<> At a NASA-sponsored reception for VIPs held at KSC's Visitors Information Center, master of ceremonies NASA Administrator James Beggs said, "We're here to honor women, such as Sally Ride, and all those who've helped her be where she is today." The 30-minute program was attended by nearly

900. Relaxing with wine and cheese, the guests heard a message from President Reagan read by presidential aid Faith Whittlesey and a speech by Congresswoman Lindy Boggs.

Also, women in the audience in ranking government and military positions and heads of national women's organizations were introduced. John Denver, a space buff who has attended sang a song - "High Flight" - especially prepared for the VIP gathering. "I'll sing it especially for Sally Ride, of course, and for all the women involved in the flight," Denver said. Before reading Reagan's speech, Whittlesey said, "Whether we be husbands, wives, brothers or sisters, we all realize the significance of Sally Ride's journey into space." The president's message, wishing the five astronauts a "smooth journey and a safe return," also noted, "This mission will mark...the first ascent of an American woman into space."

Congresswoman Boggs, noting the fact that she was present because she serves on the NASA Appropriations Committee, said, "Tomorrow is a particularly thrilling experience for the women of America and the women of the world. When Sally Ride goes up tomorrow, we will help to lift her with our hopes and our prayers." [Clark. TODAY, p. 2B, Jun. 18, 1983.]

June 18: President and Mrs. Reagan may greet Sally Ride and her four male shuttle crewmates on their return to Earth at Kennedy Space Center on June 24th. The White House press office wouldn't confirm the report, and only said any announcement of a presidential visit would be made two days before the landing. The Associated Press quoted an unnamed Washington source as saying the president would watch the landing at KSC and participate in a ceremony welcoming the astronauts back from their six-day mission. [Adams. TODAY, p. 1A, Jun. 18, 1983.]

<> An estimated 500,000 people were on hand to witness the launch of STS-7 and the first American woman's voyage into space. The estimate was provided by Brevard County sheriff's deputies and represented a crowd similar in size to that which viewed the sixth launch. [Cook. TODAY, p. 2B, Jun. 19, 1983.]

- <> Prior to its 7:33 a.m. EST launch, the last message relayed into Challenger's crew cabin came from Ride's husband, astronaut Steve Hawley. "Sally, have a ball," the message read. [Yacenda. TODAY, pp. 1A & 18A, Jun. 19, 1983.]
- <> An estimated 1628 journalists were on hand to report the launch of STS-7. This represented an increase of 490 in the press corps contingent which viewed Challenger's maiden flight in April and was the fourth largest press turnout since the space program began at Kennedy Space Center. "It was strictly Sally," NASA spokesman Rocky Raab said after the successful launch. "They came to see her." ["Ride A Big Draw for Shuttle Media," TODAY, p. 4A, Jun. 19, 1983. Yacenda. TODAY, pp. 1A & 18A, Jun. 19, 1983.]
- <> At one point during Challenger's launch, which was punctuated on the ground by cheers, rebel yells and frequent bursts of applause, Mission Control announced to the astronauts and to the launch crowd: "Your first-stage performance was nominal." One young man, obviously enjoying his first launch, indignantly retorted: "Nominal! That was fantastic!" (Nominal is simply Mission Control's restrained way of saying everything went just fine.)

Right up until the hour of launch, clouds literally hung over Challenger's departure. Rain showers spotted off the Cape Canaveral coast failed to stop the mission, but dark clouds hovering above the Shuttle's beachside launch site threatened to hide most of the rocket's initial trajectory. The clouds cleared just before liftoff. At the same time, at Dakar, Senegal, in West Africa, weather conditions improved just enough to make an emergency landing there a safe possibility were it to be needed. Just to make sure conditions were safe, senior astronaut John Young and NASA test pilot Charlie Walker flew simulated shuttle landings at KSC's runway right up to the time of liftoff. Astronaut Dave Walker was also in the air in a T-38 jet trainer. Only one last-minute glitch occurred; a seal in a line pumping super-cold liquid hydrogen from the ground to the Orbiter failed to seal properly. After several hours of working with the seal, the item eventually closed off and the shuttle's tank was topped up.

Tom Utsman, shuttle operations and management director, noted this countdown may have been the smoothest yet for a shuttle launch. Liftoff came just 59-thousandths of a second after the optimum launch time of 7:33 a.m. EST. [Yacenda. TODAY, pp. 1A & 18A, Jun. 19, 1983.]

- <> Challenger's launch pad - 39A - suffered little of the heat damage from the seventh launch that accompanied previous liftoffs, NASA officials said. "The damage to the pad was essentially nil. They figure with a week's work, they could use the pad again," said KSC spokesman Dick Young. He said that workers had repaired the pad after each of the last six launches so that it can withstand the intense heat of ignition. ["Liftoff Left Hardly A Scratch," TODAY, p. 4A, Jun. 19, 1983.]
- <> The impact of her daughter's historic flight didn't hit Joyce Ride until several minutes after Sally Ride had disappeared off the face of the Earth. "It really got to me when they said they're down-range and if there's any problem they'll land in Dakar," Mrs. Ride said after the launch. Asked if he was anxious during the countdown and liftoff, Dale Ride, the astronaut's father, confidently answered, "No, not at all. It's a great program." Bear Ride, Sally's 29-year-old sister, didn't mind being asked how she felt about the flight. "Great!" she exclaimed, punching the air with her fist. Following the launch, the Rides chatted with feminist leader Gloria Steinem, who watched the launch at the VIP site with Jane Fonda and hundreds of others. Almost unrecognized among the throng of celebrities was Dr. Edward Teller, frequently referred to as the "father" of the hydrogen bomb. When asked why he attended this shuttle launch, Teller joked, "Because I got up very early this morning." [Associated Press. TODAY, p. 3A, Jun. 19, 1983. Platt. TODAY, p. 5A, Jun. 19, 1983.]
- <> The reusable, twin solid rocket boosters used to help launch Challenger on its second flight apparently survived in good form their parachute-broken fall 29 miles to the ocean. Officials of the United Space Boosters, Inc., which assembles the booster components for NASA, reported the rockets came down very close to the recovery vessels - Liberty and Freedom - 156 miles off Cape Canaveral in the Atlantic Ocean. The vessels with the boosters in tow were expected to pass through the jetties into Cape Canaveral a day after the launch. [Yacenda. TODAY, p. 3A, Jun. 19, 1983.]
- <> Through the preflight hullabaloo, Sally Ride had been circumspect, all business. But during her first hours in space, she didn't try to suppress her enthusiasm - describing her launch as "definitely an E ticket." For aficionados of amusement park thrills, this is something like the ultimate accolade. "Roy, have you ever been to

Disneyland?" Ride asked Capcom Roy Bridges at Mission Control in Houston not long after Challenger's 7:33 a.m. EST liftoff. "Affirmative," Bridges responded. "That was definitely an E ticket," said Ride, comparing the hop into space to what were once Disneyland's and Disney World's premiere ride passes. Her first words from space, as the shuttle neared orbit, were, "See you Friday," referring to the planned return to Earth; a NASA official vowed to "roll out the red carpet!" ["Launch an E Ticket to Ride," TODAY, p. 1A, Jun. 19, 1983.]

<> The roar of Challenger's main engines were perceptibly louder than during the STS-6 launch. Low and heavy atmospheric conditions, coupled with a strong southwesterly wind, sustained the liftoff noise at low elevations rather than dissipating the sound waves in the atmosphere, said NASA spokesman Mary Fitzpatrick. The Brevard County sheriff's department and some alarm companies received scattered reports of burglar alarms in Brevard triggered by the roar. Some South Brevard residents also reported rattling of glass doors and household items not experienced during previous shuttle launches. The roar was heard as far west as Orlando, more than 50 miles east of the launch pad. ["Roar Extra Loud," TODAY, p. 3A, Jun. 19, 1983.]

June 19: Challenger started setting records long before it got off the ground; the record-setting began in its garage, the Orbiter Processing Facility at KSC. Where it took 750 days to prepare the shuttle for its first flight a little more than two years ago, it took only 63 work days for this mission. NASA officials credit the quick changes from one flight to another to its "clean flights" - the orbiter has suffered little external damage during past missions. While Columbia returned with more than 400 tiles needing repair and replacement after the first mission, fewer than a dozen had to be reglued after subsequent flights as NASA engineers improved the bonding process. Another time-cutting improvement has been the decision not to drain shuttle steering engine fuels when it returns from space....[Adams. TODAY, p. 3A, Jun. 19, 1983.]

June 21: NASA's Kennedy Space Center is preparing to contract for a study of an improved high-temperature waterproofing compound for the Thermal Protection System of the space shuttle. NASA wants a material/chemical that will be able to retain its water repellent capabilities after repeated

exposures to temperatures of 1800 degrees fahrenheit during re-entry of the orbiter. ["NASA Wants Improved Waterproofing for Shuttle Tiles," DEFENSE DAILY, p. 285, Jun. 21, 1983.]

June 22: "Due to possible schedule changes for the return of the space shuttle, the president will not travel to Florida as previously planned," said KSC chief spokesman Hugh Harris. Reagan's decision not to come to Florida underscored the nagging uncertainty underlying the entire landing attempt at KSC. At blame for the uncertainty is unsettled weather looming over the Space Coast. Their alternative would be to land either on the 24th or 25th at Edwards Air Force Base, California, where fair skies are prevailing. "We have two opportunities (to land at KSC) on Friday (24th) and one on Saturday (25th), and we're going to bust our buttons trying to make one of those," said KSC spokesman Rocky Raab. Cloud cover and limited visibility were the major negative factors in the outlook for a KSC landing, but rain would be particularly disastrous for the orbiter, tearing Challenger's valuable and delicate thermal protection tiles to shreds. [Yacenda. TODAY, pp. 1A & 16A, Jun. 23, 1983.]

<> White House advance people started laying the groundwork for the anticipated visit of the president a day or two before the June 18 launch of STS-7, but the only real work at the space center in anticipation of the visit was the partial construction of a podium at the landing site, said Hugh Harris, KSC chief spokesman. He said the special platform to accommodate the president, first lady and NASA Administrator James Beggs "was well under way but not completed." Sources close to the space center said it also would have been outfitted with bulletproof glass. There was discussion earlier in the day about breakfast at the space center with the Reagans and the families of the astronauts but the logistics for that were still being worked out when the visit was cancelled. If anything, the president's day in Brevard was going to be brief - with Reagan back in Washington by noon. [Adams. TODAY, p. 3A, Jun. 23, 1983.]

June 24: More experience landing space shuttles in less than ideal weather conditions will be the biggest factor in gaining added predictability for bringing spaceplanes to Earth, NASA shuttle program chief James A. Abrahamson said at a Kennedy Space Center news conference following the return to Earth of the shuttle's seventh flight. The next

landing attempt at Kennedy Space Center probably would not take place until December or January during Mission 11. (The first landing actually took place at KSC on February 11, 1984 at the conclusion of shuttle mission 41-B, the second shuttle mission under NASA's new numbering system.) "A few more landings under our belt" and some landings at Cape Canaveral would give added confidence for landing in marginal weather, Abrahamson said.

Problems were still being ironed out with an automatic landing system that would eventually pilot shuttles to soft landings with little dependence on their human pilots; the biggest problem remains how to get the shuttle through rain and dense fog without damaging the spaceplane's delicate tiles, said Abrahamson.

Workers at Kennedy Space Center had been primed to roll Challenger right back into its hangar to begin preparing it for shuttle flight 8, a mission that had been scheduled for mid-August. Transporting the shuttle from California to Florida was expected to delay the next launch for about eight days. [Yacenda. TODAY, p. 6A, Jun. 25, 1983. Yacenda. TODAY, pp. 1A & 20A, Feb. 12, 1984.]

<> President Reagan's eldest daughter, Maureen, made two appearances at KSC's Visitors Information Center; both times she was heavily guarded by Secret Service agents. Ironically, she had come from California to see the landing here. "I was closer to Edwards Air Force Base than Florida 24 hours ago," she said. Reagan said her father was "terribly disappointed not coming here. We were all planning a family reunion." Nevertheless she said she was enjoying her visit to KSC. Especially exciting, she said, was Sally Ride's calm in the eye of the storm over her being the first American woman in space. "She assumed responsibility for the rest of us," Reagan said. Ms. Reagan was accompanied by a coterie of VIPs from Washington.

Margaret Heckler, Secretary of Health and Human Services, lauded Ride as "a woman who speaks to America with a B.A. in English and a Ph.D. in physics. Sally Ride has allowed the eagle to fly with two wings." Elizabeth Dole, Secretary of Transportation, arrived at the VIC with Heckler, and expressed her pleasure at Ride's accomplishment, with a gentle reminder that we should "celebrate all members of the team." Representative Lindy Boggs, D-Louisiana, said: "The significance is that we have been plummeted into an age of science and technology and we need to make certain girls and

women have an opportunity to be trained in math and science and take their full and rightful place from the beginning of this enlightened age," Boggs said. "Otherwise, they will be locked into low-paying jobs...to actually have that image physically embodied in a woman as competent, proficient and professional as Sally Ride is an inspiring thing to young girls." [Plat, Skolnick, and Adams. TODAY, p. 5A, Jun. 25, 1983.]

<> The Kennedy Space Center post office mailed out 25,000 stamped envelopes commemorating a first-time Florida Shuttle landing that didn't happen. "They're not going to be worth the stamp that's on them," said Hubert James, a post office worker who is no collector. Some people will probably be very happy to have a "first day-cover" from a day that wasn't the first. Mistakes that bear a postal imprimatur have a way of gaining in value, although a distribution of 25,000 has a way of diluting that. ["Mail Goes -- Landing or Not," TODAY, Jun. 25, 1983.]

June 28: A Hughes Galaxy communications satellite was successfully launched into Earth orbit by a Delta rocket that lifted off from Cape Canaveral at 7:08 p.m. EST. Problems with a range safety console display delayed the launch 32 minutes beyond a planned launch time of 6:36 p.m. EST. Hughes Aircraft has built more commercial satellites than any other company, but the Galaxy spacecraft is the first that Hughes will also own and operate. [Yacenda. TODAY, p. 10A, Jun. 29, 1983.]

June 29: Challenger returned to Kennedy Space Center at 10:26 a.m. EST and workers immediately began the 16-hour process of demating the Shuttle from the carrier aircraft and towing the orbiter into the first of the space center's two orbiter processing facilities. Orbiter Vehicle Manager Bill Williams attributed Challenger's slightly more used appearance - including scorch marks on the white tiles over the wings - to a hotter re-entry pattern flown by the craft on this latest return to Earth. Officials at first thought only about 25 of Challenger's vital heat protection tiles were damaged during the mission, but closer inspection revealed about 100 tiles in need of replacement. Officials believe most of the damage done to the tiles was caused during the June 18 launch by chunks of ice falling off the Shuttle's huge external fuel tank. New tiles put on the leading portions of the craft's orbital maneuvering pods prior to the flight held up perfectly. Three other major

problems faced work crews; these include repair or replacement of: a leaking hydraulic pressure accumulator, an auxiliary power unit that temporarily malfunctioned during the mission and caused officials two days of concern, and an inboard brake on Challenger's right landing gear that began to self-destruct when Challenger finally touched down at Edwards. [Yacenda. TODAY, p. 16A, Jun. 30, 1983.]

JULY 1983

- July 5:** Kennedy Space Center awarded General Hydraulics Corporation (Huntsville, Alabama) a \$3,043,656 fixed-price contract in support of the shuttle program; the contract calls for General Hydraulics to fabricate, test and deliver 74 pneumatic/hypergol panels. The panels will be used on the Mobile Launcher Platform at Launch Complex 39B to service the shuttle and its various ground systems with fluids, purge gases and hypergolic (self-igniting) propellants. The propellants are to be delivered in increments beginning March 9, 1984, with the last delivery set for November 8, 1984....[Tucker. NASA/KSC NEWS RELEASE No. 150-83, Jul. 5, 1983.]
- July 6:** Specialty Maintenance and Construction, Inc. (Lakeland, Florida) won a KSC fixed-price contract to provide a payload environmental cover to be used in conjunction with a payload handling fixture (also fabricated and assembled by Specialty) which will be the first of its kind to be built.
- The contract is worth \$240,000. [Tucker. NASA/KSC NEWS RELEASE No. 148-83, Jul. 6, 1983.]
- July 7:** NASA's John F. Kennedy Space Center awarded a \$4,079,490 contract extension to Planning Research Corporation (McLean, Virginia) for support of the space shuttle, expendable vehicles, and cargo operations at KSC. The cost-plus-fixed-fee contract extension covers the period from April 1, 1983, through July 31, 1983. [Tucker. NASA/KSC NEWS RELEASE No. 151-83, Jul. 7, 1983.]
- July 11:** NASA's Kennedy Space Center awarded Boeing Services International, Inc. (Kennedy Space Center, Florida) a \$9,879,970 extension of its ground systems operations contract. Covering the period from July 1, 1983, through September 30, 1983, the contract requires BSI to provide facility and utility operations and maintenance, including doors and platforms, elevators, cranes, service shops, miscellaneous electrical and mechanical systems, and water deluge and distribution systems....[Tucker. NASA/KSC NEWS RELEASE No. 155-83, Jul. 11, 1983.]

<> NASA selected Boeing Services International (Cocoa Beach, Florida) for negotiation of a new contract in support of activating Launch Complex 39's Pad B and Mobile Launcher Platform 3 for space shuttle operations. The cost-plus-award-fee contract period runs from September 1, 1983, through October 31, 1986. Boeing's proposed cost for the contract period was approximately \$17.8 million. The pact is for final connection, testing, and verification of piping, electrical, mechanical, hydraulic, pneumatic and other systems to be used at Pad 39B and on MLP 3. It also covers the fabrication and testing of two Centaur rolling beam access arms which will be deployed from the cargo bay of the shuttle to launch satellites and spacecraft into higher orbits or on escape trajectories. [Tucker. NASA/KSC NEWS RELEASE No. 157-83, Jul. 11, 1983.]

July 12: Kennedy Space Center awarded David Boland, Inc. (Titusville, Florida) a \$1,404,000 fixed-price contract to build a multi-function facility in the Vehicle Assembly Building area of Launch Complex 39. Boland, in a period running from July 13, 1983, through January, 1984, will construct a new one-story building, remove, relocate and install existing food service equipment from the Launch Control Center (LCC) to the new building, and be responsible for new paving and site drainage work on extension of utilities. The new structure, which is needed to make additional space in the LCC available for operational personnel, will house a cafeteria and a medical dispensary. [Mitchell. NASA/KSC NEWS RELEASE No. 132-83, Jul. 12, 1983.]

<> NASA announced August 20 as the tentative date for the launch of STS-8. Liftoff would occur at 2:00 a.m. EST and would be the first nighttime shuttle launch. [Adams. TODAY, p. 1A, Jul. 13, 1983.]

July 16: Fourteen years ago, Neil Armstrong and Edwin "Buzz" Aldrin landed on the moon during the Apollo 11 mission. Kennedy Space Center's Visitors Information Center held its annual celebration with festivities which included programs and speeches about the Apollo 11 mission and a shuttle update. [Keefer. THE TRIBUNE, p. 4A, Jul. 20, 1983.]

July 18: President Reagan's science adviser, George Keyworth, has reversed course and asked the nation's space agency to prepare a "grand vision" for the future that might include not only a U.S. space station but eventually manned lunar bases and astronaut trips to Mars. Asked about the shift in Keyworth's thinking, Robert F. Freitag, deputy director of NASA's space station task force, said: "Support for a station comes about with understanding - when we sit down with people, explain it to them and give them time to think about it; Dr. Keyworth is a good example of that....He's beginning to see some virtue he didn't see a year ago." ["Advisor Rewrites Script: Launch Big Space Thrust," TODAY, pp. 1A & 10A, Jul. 18, 1983.]

<> NASA's chief predicted President Reagan soon will give the go-ahead for an American manned space station, saying, "If the United States does not take this step, we will lose our pre-eminence in space." James M. Beggs, NASA Administrator, said there have been encouraging signs from the White House recently and he expects an approval within a year. Beggs spoke at a Space Station Symposium attended by several hundred industry, government, foreign and military planners gathered to provide NASA with final ideas before presenting its case to the White House this fall. "The space shuttle is moving ahead well, but it allows only a short time in space," Beggs said. "The space station is the next logical step for long-duration work."

President Reagan endorsed the space station project in his State of the Union address on January 25, 1984. ["U.S. Space Station 'Next Logical Step,' Says NASA's Beggs," TODAY, p. 1A, Jul. 19, 1983. Yacenda. TODAY, pp. 1A & 16A, Jan. 26, 1984.]

July 19: Cat Island, an uninhabited island 10 miles off Mississippi's Gulf Coast, was being considered as the site for the USA's first commercial satellite launch, said Mississippi Governor William F. Winter. Space Services Inc. (Houston, Texas) led by former astronaut Deke Slayton, wants to launch a satellite in early 1985. ["Gulf Coast Isle Considered As A Launch Site," USA TODAY, p. 3A, Jul. 20, 1983.]

<> Kennedy Space Center awarded Boeing Services International, Inc. (Kennedy Space Center, Florida) a \$7,636,162 extension of its cost-plus-fixed-fee contract for supply and

transportation services. The contract period is from July 1, 1983, through September 30, 1983. BSI's extension calls for the company to manage and perform supply support operations and services, transportation management, and supply and transportation planning functions and is to provide purchasing support for these operations as well. [Tucker. NASA/KSC NEWS RELEASE No. 160-83, Jul. 19, 1983.]

<> Kennedy Space Center firefighters extinguished a small fire about 10:00 a.m. EST at the Apollo 11 launch tower workers are disassembling. The fire started when a welder cut through electrical cables and insulation. A NASA spokesman said the blaze was put out in minutes and caused no damage or injuries. The gantry site is being cleared for use as a third shuttle launch platform. ["Historic Tower Catches Fire," TODAY, p. 1B, Jul. 20, 1983.]

July 26: Challenger was towed from its Kennedy Space Center hangar and moved to its next stop on the way back to launch pad 39A and shuttle mission 8. Workers spent only 26 days working on the Challenger in the OPF in preparation for the tentatively scheduled August 20 liftoff. That's a speed record for the contractor-NASA processing team. Following the shuttle's return to KSC from Edwards AFB June 29, technicians worked three shifts around the clock with only Independence Day off, said KSC spokesman Mark Hess. Challenger was backed out of the OPF at 1:28 p.m. EST and was inside the VAB fifteen minutes later....All 31 "anomalies" - operational abnormalities - encountered with Challenger during the seventh mission were corrected during its stay in the OPF:

- * A damaged windshield was replaced. It was believed to have been pock-marked by a micrometeor or miniscule particle of space debris while Challenger was in orbit.

- * Several landing gear components were replaced. They were damaged or overstressed when small explosives were inadvertently fired putting undue strain on the gear following the orbiter's return to Earth.

- * Following discovery of a main brake mechanism that disintegrated during landing, officials of NASA and B.F. Goodrich, the brakes' manufacturer, decided to replace all four main landing gear brakes.

* Challenger's space-going toilet was swapped for the toilet which belonged in Discovery, still being constructed in California; an electronic circuit had malfunctioned on Challenger's toilet.

* An auxiliary power unit and an hydraulic system pressure accumulator, both of which malfunctioned during Mission 7 were replaced with new units.

* An on-board computer printout machine and CRT, both of which broke down in space, were swapped for new equipment.

* A total of 76 thermal protection tiles, as well as a part of the advanced thermal protection blankets used on the upper part of the orbiter, were damaged. Some of this repair work was not yet completed. [Yacenda. TODAY, pp. 1A & 16A, Jul. 27, 1983.]

July 28: NASA officials canceled a tentative August 20 launch of the eighth shuttle mission, but did not decide on a new date for the liftoff. Estimates put the date between August 23 and August 30. Continuing difficulties with the \$100 million Tracking and Data Relay Satellite (TDRS) accounted for the delay, according to NASA spokesman David Garrett at the agency's headquarters in Washington, D.C. ["NASA Postpones Challenger Liftoff," TODAY, p. 1A, Jul. 29, 1983.]

<> A new generation of AT&T Telstar satellites was launched into orbit aboard a Delta rocket from Cape Canaveral at 6:49 p.m. EST. The liftoff was delayed 28 minutes due to problems with a tracking radar at the Antigua ground station in the Caribbean. Uncertain weather at the launch site, including winds, heavy shower activity, and airborne hail contributed to the delay. [Yacenda. TODAY, p. 16A, Jul. 29, 1983.]

<> STS-7's history-making crew of Bob Crippen, Rick Hauck, John Fabian, Sally Ride and Norman Thagard returned to KSC for a red carpet welcome. More than 2,000 persons - workers, family members, retirees and guests - were present to see KSC Director Dick Smith roll out the red carpet for the astronauts. The words "Welcome Back to KSC STS-7" were emblazoned on the carpet, but Smith pointed out the "STS-7" portion of the message was removable. "You can touch it. You can feel it. You can't walk on it," said Smith. "You've got to land here to walk on it," he quipped to the crew. A surprise guest was a space-suited Mickey Mouse who

presented Mickey Mouse watches to the astronauts, and a large framed "E-ticket" and a kiss to astronaut Sally Ride. [Yacenda. TODAY, p. 1A, Jul. 29, 1983.]

AUGUST 1983

August 1: Challenger's scheduled rollout from the Vehicle Assembly Building to the launch pad early in the morning was delayed a day because of bad weather, said NASA spokesman Jim Ball. "Meteorologists were predicting a high probability of thunderstorms and lightning," he said. "We decided to play it safe....We have plenty of time;" preparations are on schedule, he added. The launch date was officially rescheduled to Friday, August 30. The rollout did begin just after midnight on August 2 and was completed shortly after dawn. [Shealy. TODAY, p. 10A, Aug. 1, 1983. Yacenda. TODAY, p. 12A, Aug. 2, 1983.]

August 3: International Business Machines Corp. (Cape Canaveral, Florida) won a \$10.7 million contract extension for shuttle support. IBM's Cape Canaveral operations will support cargo processing operations at Vandenberg Air Force Base, California; the company will be responsible for the construction of the Orbiter Functional Simulator which will be used to test electrical connections between the shuttle and its payloads. [Kassak. TODAY, p. 14C, Aug. 3, 1983.]

August 4: The STS-8 crew - Truly, Brandenstein, Gardner, Bluford, and Thornton took part in a successful countdown demonstration test at Kennedy Space Center, said Rocky Raab, NASA spokesman. The simulated launch - scheduled for 10:00 p.m. EST - failed to occur. "The ground launch computers detected something that wasn't correct and the computers aboard the orbiter stopped the countdown at about 13 seconds. We're still analyzing it, but it's happened before," said Raab...

At a brief pad-side meeting with the media, crewmen gave every assurance they were ready for their flight and admitted some disappointment in the 10-day launch delay. Guion Bluford, first American black space traveler, told reporters he had gotten "pretty used to" being asked similar questions by reporters. "I give them the same answers," he quipped. "I'm looking forward to flying."

Commander Truly said there was some chance the mission might be extended an extra sixth-day, to allow more time for checking out TDRS - the Tracking and Data Relay Satellite.

Mission Specialist Gardner said TDRS engineers were "catching up" with the problems that have delayed check-out of the satellite. [Yacenda. TODAY, pp. 1A & 20A, Aug. 5, 1983.]

August 7: At Kennedy Space Center, two tornadoes were seen touching down at 3:00 p.m. EST, northwest of the Vehicle Assembly Building, a spokesman for the KSC Fire Department said. The twisters were traveling southeast, but dissipated before hitting any structures, he said. [Crook. TODAY, p. 1B, Aug. 8, 1983.]

August 11: Space shuttle mission 8 astronauts Guion "Guy" Bluford and Dale Gardner were at Kennedy Space Center to participate in tests involving the mission's primary cargo, an Indian multipurpose communication and weather satellite. The two mission specialists will be responsible for deploying the INSAT spacecraft from Challenger's cargo bay on the second day of the five-day mission. KSC spokeswoman Weida Tucker said launch engineers activated the spaceplane's electrical power in the morning for the cargo interface tests which verify electrical and mechanical hook-ups between the orbiter and the satellite. Preparations for next week's loading of hypergolic-reactant fuels onto the orbiter were proceeding smoothly and should be completed today (Aug. 12), Tucker said. Large tanks used to store liquid oxygen and liquid hydrogen on the fixed service structure at launch pad 39A, where the Shuttle was moved last week already have been readied, Tucker said. [Yacenda. TODAY, p. 20A, Aug. 12, 1983.]

August 15: Space agency officials decided on a one-day extension of the eighth space shuttle mission, scheduled for launch on August 30; the flight will last six days. The new schedule announced by NASA calls for a landing at Edwards Air Force Base, California, during the shuttle's 98th revolution around the Earth. This would be the first shuttle flight to both take off and land at night. [Yacenda. TODAY, p. 1A, Aug. 16, 1983.]

<> The European-built Spacelab began its trip to Columbia's cargo bay by being hoisted from its cradles in the Operations and Checkout Building. The 21 1/2-ton orbiting laboratory was placed into a payload transport canister in preparation for transfer to the Columbia on August 16, 1983.

Four members of the six-person 41-A crew took part in fire training exercises at the space center. Mission commander John Young, pilot Brewster Shaw, and mission specialists Owen Garriott and Robert Parker took turns running an armored personnel vehicle through grass and swamps practicing what they would do to escape a blast if things go wrong at launch. Later the astronauts observed the results when hypergolic reactants - used for some propulsion systems aboard the Shuttle - come in contact with one another. [Yacenda. TODAY, p. 14A, Aug. 16, 1983.]

August 16: The installation of Europe's orbiting scientific laboratory - Spacelab - was completed at 12:51 p.m. EST. The process began shortly before 9:00 a.m. More than four dozen contractor and NASA personnel took part in the installation process. Alan Thirkettle, resident manager of the European Space Agency's KSC office, said the loading operation went well, but that he had tired of watching the lab lowered "one millimeter at a time" into the orbiter's cargo bay. With the completion of installation, NASA assumed responsibility for Spacelab for the duration of the mission. [Yacenda. TODAY, pp. 1A & 20A, Aug. 17, 1983.]

August 17: SATCOM II-R, RCA's latest telecommunication satellite, was formally unveiled at Cape Canaveral Air Force Station. The RCA spacecraft, scheduled for launch on September 8, will replace the older SATCOM II satellite which began service in March 1976; the newer satellite has a longer design life - 10 years - and the capacity to carry more fuel which is necessary to keep it at its assigned station in space, said Bill Paulme, RCA Launch Manager. [Yacenda. TODAY, p. 18A, Aug. 18, 1983.]

August 18: For the second successive day, Hurricane Alicia tore through Texas and prevented STS-9 commander John Young, pilot Brewster Shaw and mission specialist John Parker from flying out of Houston to join fellow crew members Owen Garriott and Byron Lichtenberg for major tests planned at Kennedy Space Center.

Meanwhile, technicians began installation and checkout of the two spacesuits that were to fly aboard Challenger, the Columbia's sister ship. [Yacenda. TODAY, p. 20A, Aug. 19, 1983.]

August 19: Kennedy Space Center awarded a \$10.9 million contract to Saver Mechanical Inc. (Jacksonville, Florida) for construction work on the second space shuttle launch pad, 39B, including installation of an oxygen vent arm, a hydrogen intake unit, an access platform, and more than 70 panels provided by other contractors. Saver's contract runs through February 1985. ["Launch Pad 39B Contract," DEFENSE DAILY, p. 271, Aug. 19, 1983.]

August 20: The first of the Army's Redstone ballistic missiles was launched from Cape Canaveral twenty years ago on this date. The Mercury-Redstone launch system put Alan Shepard and Gus Grissom into sub-orbital flight in 1961. [Yacenda. TODAY, p. 16A, Aug. 20, 1983.]

<> The latest plans for a presidential visit in Brevard County call for Ronald Reagan to visit KSC on Labor Day, September 5, KSC sources said. The invitation to the president and first lady came from NASA Administrator James M. Beggs. Reagan was last scheduled to visit the space center for the first scheduled landing of the shuttle at KSC on June 24, but neither the visit nor the landing took place as planned. [Yacenda. TODAY, p. 10A, Aug. 20, 1983.]

August 21: Two teams, led by Rockwell International and Lockheed Corp., have responded to NASA and KSC's requests for proposals in a competition for the \$6 billion Shuttle Processing Contract (SPC). Rockwell's team included fellow incumbents Boeing, Martin Marietta and USBI plus United Airlines. The winning Lockheed team (the announcement came September 7) included Grumman Aerospace Corp., Morton Thiokol, Inc. - the team's only incumbent - and Pan American World Airways. Lockheed's completed response to the RFP filled 12 ring-type binders and weighed 30 pounds. At the effort's peak, about 175 Lockheed people worked on the SPC proposal. [Hodges and Yacenda. TODAY, pp. 1A & 10A, Aug. 21, 1983. Stein. THE ORLANDO SENTINEL, pp. A-1 & A-7, Sept. 8, 1983.]

August 22: Columbia, America's first space shuttle, will be retired from service for two years because of B-1 strategic bomber/orbiter production at Rockwell International affecting Columbia modifications and a need to cannibalize Columbia parts for orbiter production and flight operations. NASA had decided not to fly the spacecraft

between Spacelab 1 and the modification period but, instead, will place Columbia in storage for 14 months before modifications begin. [Covault. AVIATION WEEK & SPACE TECHNOLOGY, pp. 21 & 22, Aug. 22, 1983.]

<> A study commissioned by the National Park Service and written by Tampa-based Florida Land Design and Engineering Company outlined seven options for continued public access to Playalinda Beach. These include:

1. Maintaining the status quo with NASA continuing to close sections of the Canaveral National Seashore beach and security checks of beachgoers whenever the shuttle is on its launch pad;
2. Creating a shuttle bus service for beachgoers;
3. Continuing use of SR 402 with increased shuttle security;
4. Building a new road along an existing railroad bed;
5. Moving the railroad and using the existing bed for a road;
6. Building a pontoon bridge well north of the existing road;
7. Building a bridge across Mosquito Lagoon to Max Hoeck Creek. [Heller. TODAY, p. 1B, Aug. 22, 1983.]

August 24: Tropical Storm Barry - packing 55 mph winds - closed in on Brevard County with the center only 90 miles due east of Melbourne at midnight. The storm threatened an 8-day delay in the Aug. 30 launch. Basing their calculations on forecasts that Barry wouldn't achieve full hurricane strength even if it struck Cape Canaveral, NASA officials decided the shuttle should be kept on its pad, several hundred yards from the ocean. NASA Launch and Landing Director Al O'Hara, meeting with other key members of the shuttle launch team at 6:00 p.m. EST, decided forecasts weren't bad enough to justify removing Challenger and forcing a launch delay. Precautionary measures taken earlier in the day called for a team of up to 150 workers to comb the launch pad area, removing any debris and unneeded equipment that could pose a danger to the shuttle. [Yacenda. TODAY, pp. 1A & 16A, Aug. 25, 1983.]

- <> Federal Women's Week, August 21-27, was highlighted at KSC by a presentation in the Training Auditorium and luncheon in the Mission Briefing Room. This year's theme was "We are capable, we are dedicated." Luncheon speakers included KSC Director Dick Smith, Libby Wells, and Debbie Dobson. Susan Woodard sang several Broadway show tunes. ["Federal Women's Week Observed at Space Center," SPACEPORT NEWS, p. 3, Sept. 2, 1983.]

August 25: Tropical Depression Barry, formerly Tropical Storm Barry, turned into little more than cool, rainy wind at KSC. The eye of the storm passed 45 miles south of the space center. "We suffered no damage. We did get some rain, very light rain. It was a little breezier than usual," said KSC spokesman Jim Ball. [Yacenda. TODAY, pp. 1A & 20A, Aug. 26, 1983.]

- <> KSC officials ordered Challenger's cargo bay doors re-opened as concerns arose about four electrical connectors in one of the main power lines to the Payload Assist Module (PAM) attached to India's multipurpose satellite. A special "pull test" revealed the four connections to be tight and the cargo bay doors were sealed again on the night of August 26. [Yacenda. TODAY, pp. 1A & 16A, Aug. 27, 1983.]

August 27: Republican sources in Washington said President Reagan would definitely visit Kennedy Space Center on Labor Day and the Florida GOP chairman - Henry Saylor - said he'd also bet the president would come to KSC. [Delaney. TODAY, p. 1B, Aug. 28, 1983.]

- <> Experts predicted excellent conditions for the August 30 night launch of the Challenger. "From what it looks like right now, we ought to have a pretty nice day," said Bob Gill, a forecaster with the National Weather Service in Daytona, Florida. Although he said there is a chance for afternoon and evening thunderstorms, they shouldn't interfere with the liftoff. [Thomas. TODAY, p. 1A, Aug. 28, 1983.]

- <> "We're ready to fly," Mission 8 commander Dick Truly, 45, told NASA well-wishers and media representatives upon the crew's arrival at Kennedy Space Center at 7:25 a.m. EST.

The other crew-members included Dr. Bill Thornton - oldest American, at 54, to fly in space, pilot Dan Brandenstein, 40, and mission specialists Guion Bluford, 40, and Dale Gardner, 34. Bluford would be the first American black to go into space. [Yacenda. TODAY, pp. 1A & 16A, Aug. 28, 1983.]

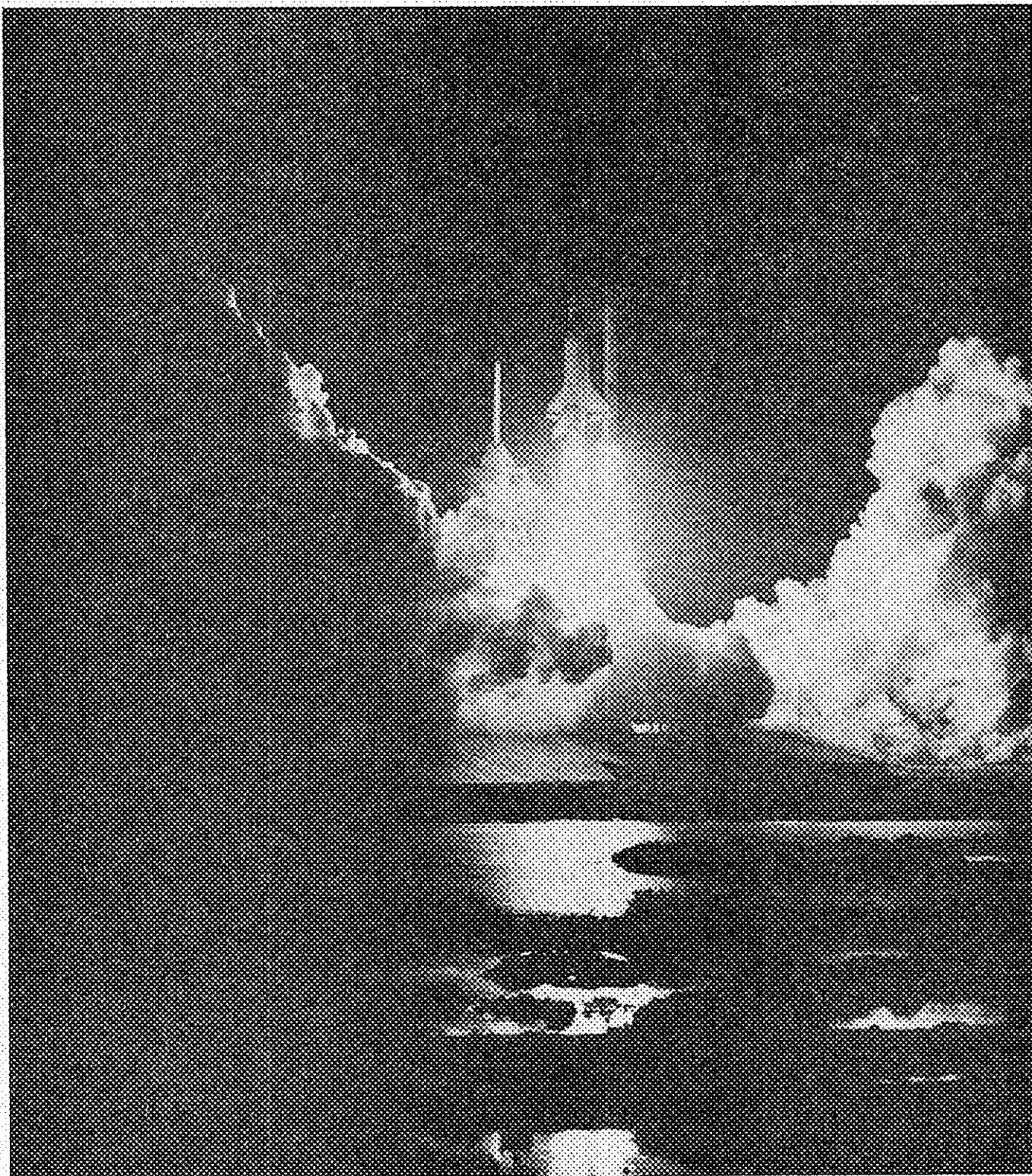
August 28: NASA officials said observers across four states and in two island nations would be able to catch a glimpse of Challenger's night launch on August 30 at 2:15 a.m. EST. The liftoff should be visible for up to 450 miles. [Yacenda. TODAY, p. 10A, Aug. 29, 1983.]

<> Noting the "possibility of mid-air collisions" in the scramble for airspace to view the takeoff, NASA said every restricted area associated with KSC "will be activated for the launch. The more prudent pilot may wish to remain grounded during the shuttle launch rather than risk the chance of a collision or a violation of federal aviation regulations." NASA spokeswoman Lisa Malone said. [Jean. THE ORLANDO SENTINEL, p. A-8, Aug. 29, 1983.]

August 29: Shuttle astronauts John Young and Sally Ride were expected at KSC to lend a hand during the countdown and liftoff of STS-8 at 2:15 a.m. EDT, August 30. Young, scheduled to fly on STS-9 in October, will assume his usual duty of checking the weather in a trainer jet just before liftoff and landing. Sally Ride will fly in an observation and photography airplane. [Fisher. THE ORLANDO SENTINEL, p. A-8, Aug. 29, 1983.]

<> NASA Launch Director Al O'Hara predicted "the best weather we've ever had" for a shuttle launch, with generally clear skies, gentle breezes and temperatures in the mid-70s all forecast for the start of Challenger's STS-8 mission. NASA Test Director Bob Henschel said there were "no significant problems" in prelaunch preparations. He characterized the countdown as the smoothest ever for a shuttle launch. [Yacenda. TODAY, pp. 1A & 10A, Aug. 29, 1983.]

<> Angry at being ignored by federal officials who will decide the fate of North Brevard's only beach, the Save Our Beach citizens group drafted a 13-page indictment of a recent



The 2:32 a.m. EDT (Aug. 30) launch of Challenger on its STS-8 mission marked two significant firsts for the U.S. space program: The first Black in space and the first night shuttle launch.

beach access study commissioned by the National Park Service. The SOB group organized three years ago to fight for continued public access to Playalinda Beach. That access is jeopardized because the only access road - SR 402 - lies within NASA's shuttle security zone. [Heller. TODAY, pp. 1B & 3B, Aug. 30, 1983.]

<> Arnold Richman, chief of KSC's Visitors Services Branch, expected a healthy turnout for the launch of America's first black astronaut aboard Challenger on August 30. "We'll probably have about 40,000 John Q. Publics out here with car passes," said Richman, "and about 3,500 at the main VIP site, plus another 2,500 at the other VIP site." [Clark. TODAY, pp. 1A & 10A, Aug. 29, 1983.]

<> Sally Ride, in Brevard County for the night launch of STS-8, said she is eager to get back in space and would have loved to be part of the current flight. "I'm looking forward to the second flight - whenever that is - even more than the first flight," she said. "It's a great way to spend a week." Ride's husband, astronaut Steve Hawley, and another woman astronaut, Judy Resnick, are scheduled to launch in the spring of 1984. "I talked to Judy quite a bit, but one of the things we learned on the flight is there's no particular advice that I need to give her," Ride said. "We didn't have any problem either associated with me being female or being a mixed crew. I came back and told her that and that didn't surprise her." [Associated Press. TODAY, pp. 1A & 12A, Aug. 30, 1983.]

August 30: Launch of STS-8 was delayed 17 minutes because of cloudy, wet weather. Challenger cleared its tower on pad 39A at 2:32 a.m. EDT. "Oh, boy, you should have seen us up here. It was daylight all the way up," reported mission commander Dick Truly. Observers from as far away as the Bahamas reported catching a glimpse of the shuttle's fiery exhaust. Launch officials held the countdown at the T-9 minute mark until weather reports from forecasters and from astronaut Bob Crippen flying above KSC gave a clearance for launch. The crew - Dick Truly, Dan Brandenstein, Dale Gardner, Guion Bluford, Jr., and Bill Thornton - rode through a pouring rain in a NASA van to the pad and boarded two hours and fifteen minutes before launch. New, more powerful solid rocket boosters, generating about 4 percent more power than on previous launches, made their debut on STS-8. [Yacenda. TODAY, pp. 1A & 12A, Aug. 30, 1983.]

- <> Local authorities found it difficult to estimate crowd size for the STS-8 2:15 a.m. EST liftoff, but stated it appeared to be less than the quarter-million of earlier turnouts. Overall, law enforcement officers throughout Brevard County reported much less disruption over previous launches. Titusville desk officer William Lowe said he normally gets 100 calls from people asking for directions. He said he only got two calls on Aug. 29. Florida Marine Patrol officials said boaters were behaving well on the river. [Mingle & Heller. TODAY, p. 3A, Aug. 30, 1983.]
- <> Kathy Mason, a spokeswoman for United Space Boosters, said that despite the dark, workers from the ships UTC Freedom and UTC Liberty located the spent casings of the solid booster rockets by radar just eight minutes after the 2:32 a.m. EST liftoff, or about six minutes after they separated from the orbiter and parachuted into the water. Within an hour, she said, the retrieval ships had spotted the boosters and crews had marked the tips in the water with lights. No damage to the boosters was reported. Recovery operations began at sunrise, and by 7:50 a.m. EST, the boosters were being towed back to Port Canaveral, according to NASA spokesman Miles Waggoner. He said they were due to arrive sometime the morning of August 31st. ["Boosters Heading for Port," TODAY, p. 2A, Aug. 31, 1983.]
- <> The first of Challenger's two solid rocket boosters was reported in port at 8:10 a.m. EST; the second followed fifty minutes later. Both boosters fell within eight miles of recovery ships 150 miles offshore from Cape Canaveral. Strobe lights, used for the first time on this flight helped guide the ships to the spent rocket casings. Using a new type of plug, divers were able to drain sea water from the casings prior to towing them. [Yacenda. TODAY, p. 20A, Sep. 1, 1983.]
- <> At age 27, Mark Hess was the youngest person to serve as the official "voice" of a major launch. The UCF graduate was the link with the firing room for hundreds of new media representatives, thousands of spectators and millions of television viewers. [UPI. THE ORLANDO SENTINEL, p. A-11, Sep. 1, 1983.]

<> George Roberts was one of several Tuskegee Airmen on hand to watch Guion Bluford become the first black to fly in America's space program. The Tuskegee Airmen were Army pilots who graduated in the Army's segregated training program at the Alabama College in the early years of World War II. Also on hand were John Jacob, president of the National Urban League, basketball star Wilt Chamberlain, FAMU dean Dr. Lee Evans, and entertainer John Denver. [Platt, Hess and Salamon. TODAY, p. 3A, Aug. 31, 1983.]

SEPTEMBER 1983

September 3: President Reagan, who cut short his California vacation to return to Washington because of the reported shooting down of a South Korean airliner, canceled his planned Labor Day visit to the Kennedy Space Center. Officials said Vice President Bush would come in his place to attend a picnic for the 15,000 government and private industry employees. [AP, "Reagan Cancels Picnic Visit," THE NEW YORK TIMES, p. 4A, Sep. 4, 1983.]

September 5: Challenger's night launch from KSC on August 30 verified new ascent capability that should allow future flights to make better use of propulsion margins to counter any emergencies and provide extra thrust for orbiting heavier payloads such as Spacelab 1. Mission 8 astronauts said their night flight into orbit was different from what they had expected or what Captain Dick Truly had experienced during his Mission 2 daylight launch. They said the orbiter appeared engulfed in fire during flight on both the solid rocket boosters and the orbiter's main engines, followed by pulsating reflections from the main engines alone that left Commander Dale A. Gardner wondering whether all three of the main engines were still operating normally during the ascent..."The last thing I remember was external tank separation. It looked like we were inside a ball of flame for about 15 seconds, and it looked like the fire was never going to stop," he said. [Covault. AVIATION WEEK & SPACE TECHNOLOGY, pp. 21-23, Sep. 5, 1983.]

<> Heat exhaustion brought more than 150 people to the first aid station at KSC's Labor Day picnic attended by 14,000 employees, invited guests and their families. KSC Director Dick Smith, addressing the crowd before Vice President George Bush's turn to speak, said KSC has "the best darn government/contractor team in the world." NASA Administrator Jim Beggs echoed Smith's remarks, saying "our people are our most important and most precious resource." NASA employee John King said Vice President Bush's positive statements raised hopes among many space workers about a proposed American space station. [Crook. TODAY, p. 1, Sep. 6, 1983.]

<> "Thanks to every one of you, the five-man crew of the Challenger has blazed a new path of opportunity for all Americans and free people everywhere," Vice President George Bush said to as many as 14,000 space center workers and their families celebrating at a Labor Day picnic at KSC. The vice president lost no opportunity for heaping scorn on the Soviet Union. Searching for adjectives at times, Bush repeatedly interrupted his prepared remarks to make references to the "cowardly incident" in which a Korean airliner was shot down by a Soviet fighter plane in the previous week. It was this incident which kept President Reagan from making an appearance at the KSC Labor Day affair. [Yacenda and Delaney. TODAY, pp. 1A & 3A, Sep. 6, 1983.]

September 7: Lockheed Corp., challenger to incumbent Rockwell International, was awarded the largest space service contract ever when NASA declared it the winner of the \$6 billion shuttle processing contract. Lockheed planned to hire 85 to 90 percent of shuttle processing workers at Kennedy Space Center, but Lockheed Space Operations president Al Schroter said there would be "a few hundred" layoffs to cut costs. "It's a labor-intensive business," he said. "You can't make a cake without breaking some eggs." Lockheed's team of contractors included Grumman Corp., Morton Thiokol, Inc. and Pan American World Services. KSC Director Dick Smith informed Lockheed of NASA's decision by phone at 3 p.m. The decision was made by NASA Administrator James Beggs. [Stein. THE ORLANDO SENTINEL, pp. A-1 & A-7, Sep. 8, 1983.]

September 8: All systems were "go" as RCA American Communications successfully launched its third advanced domestic communications satellite, the SATCOM IIR. The launch atop a Delta rocket from Cape Canaveral Air Force Station's Pad 17B came exactly on time at 6:52 p.m. By the time the Delta finally disappeared from view, it was 65 miles high, 244 miles out over the Atlantic, and traveling at more than 11,600 miles per hour. The advanced type SATCOM IIR successfully employed the PAM (Payload Assist Module) upper-stage booster rocket for this launch. [Yacenda. TODAY, p. 20A, Sep. 9, 1983.]

September 9: Kennedy Space Center awarded a \$1,466,288 contract to Ivey's Steel Erectors, Inc. (Merritt Island, Florida) for a new Solid Rocket Booster Paint Facility. The fixed-price contract runs from September 13 through March 12,

1983, and is one set aside for award to a small business firm. Ivey's will provide the labor, equipment, and materials to supply, install and test a complete SRB paint facility at the Hangar AF Complex on Cape Canaveral Air Force Station in support of the shuttle program. The main activity in the new facility will be the total refurbishing of the surfaces of booster frustums and forward and aft skirts. Small hardware pieces of the boosters will also be refurbished in this facility. [Malone. NASA/KSC NEWS RELEASE No. 219-83, Sep. 9, 1983.]

<> The space shuttle Challenger riding atop its 747 carrier plane returned to Kennedy Space Center at 6:57 p.m. and KSC crews immediately started work on separating the two crafts, a process they estimated would take about twelve hours and culminate in a return to the Orbiter Processing Facility. The four-day turnaround time between Edwards and KSC was the quickest ever for the shuttle, according to KSC officials. Looking none the worse for its journey, NASA officials said the Challenger sustained the least damage of any flight so far. "It's in excellent shape," said Herman "Fritz" Widick, the shuttle's ground operations manager in California who accompanied the shuttle to KSC aboard the 747 carrier. Widick said one engine would have to be replaced due to a minor leak in a fuel line that most likely occurred during engine shutdown. "That's no problem," he said. "It might take 24 hours to do it." Challenger lost none of the thermal protection tiles, but 27 of them were chipped and face replacement along with the shuttle's toilet, Widick said. [Stanley. TODAY, p. 1A, Sep. 10, 1983.]

September 14: Rockwell International announced the closing of its small Cocoa Beach office, according to Bob Gordon, spokesman for the shuttle processing company which lost the \$6 billion SPC to Lockheed on September 7. The office had been opened earlier in the year specifically to help Rockwell prepare its Shuttle Processing Contract bid, Gordon said. ["Rockwell to Close Local Office," THE TRIBUNE, p. 4A, Sep. 14, 1983.]

<> Lockheed Space Operations Co. processed an average of 150 applications a day in its efforts to gear up for a NASA-Air Force contract to service the shuttle between flights, said Lockheed's president. Speaking at a luncheon meeting of the Titusville Area Chamber of Commerce, Al Schroter said Kennedy Space Center workers concerned about cuts in pay or benefits if hired by Lockheed have nothing to worry about.

"We're going to pay the same salary to the people, providing they are doing the same work as before," Schroter said. "If they are hired to do something different, the pay will be different," During the months the company spent in preparing its contract proposal for NASA, Lockheed assembled employment data on each of the 6,000 workers. Schroter said the information covered each person's job assignment, shift, working hours, overtime pay and projected pay raises over the ensuing six years. The information also indicated which workers were covered under the 13 separate collective bargaining agreements at KSC. Schroter said Lockheed would honor all current union contracts. [Hodges. TODAY, p. 18C, Sep. 15, 1983.]

September 20: Lockheed Space Operations Co. was selected over the incumbent team headed by Rockwell Shuttle Operations, Inc. for the \$6 billion Shuttle Processing Contract (SPC) because it was rated better in almost every area of "Mission Suitability," particularly in management, where Rockwell's proposal for a multi-company management approach was found to be "unsuitable," reported NASA Administrator James Beggs. He said Lockheed was the clear winner of the competition. Lockheed was also found to have offered the lower potential cost, a second criterion, and the Source Evaluation Board (SEB) said it had a high level of confidence in its assessment of probable cost. ["Lockheed Selected Over Rockwell for SPC for Better Management Approach," DEFENSE DAILY, p. 77, Sep. 20, 1983.]

<> Interior Secretary James Watt presented a posthumous award for valor to the widow of U.S. Fish and Wildlife Service worker Beau Sauselein of Titusville, killed two years ago in a fire on Kennedy Space Center property. But the family of Scott Maness, also killed in the fire, refused to accept an award and still blames the government for his death. ["Watt Gives Award to Worker's Widow," THE ORLANDO SENTINEL, p. B-6, Sep. 21, 1983.]

September 21: Kennedy Space Center awarded Applicon, Inc. (Burlington, Massachusetts) a contract for on-site maintenance and repair of KSC's automated drafting system. The fixed-price contract, valued at \$203,504, was initiated August 12 and runs through March 31, 1984. [Malone. NASA/KSC NEWS RELEASE No. 198-83, Sep. 21, 1983.]

<> Six EG&G firefighters were suspended from duty at Kennedy Space Center following an early morning protest of labor practices, according to Sam Runion, president of the Transport Workers Union. The six were among a group of about 30 off-duty firefighters who picketed at KSC's Gate 3 beginning at 6:30 a.m., Runion said. The protest stemmed from contract disputes between EG&G and the company's 85 firefighters represented by Local 525. TWU workers claim EG&G has been substituting paramedics for firefighters and plans to reduce insurance coverage after September 30. Runion said the firefighters' contract, which expires in December, 1984, dictates that any changes in insurance must leave the coverage equal or better than the current policy. KSC officials issued a statement calling the protest "informal" and reporting only slight traffic delays. EG&G spokeswoman Shirley Kidd said EG&G would have no immediate comment on the protest. [Shealy. TODAY, p. 1B, Sep. 22, 1983.]

<> Hughes Aircraft Co. executives planning a Titusville satellite assembly plant are drafting a proposal that goes well beyond previously announced goals, one that would require up to 800 employees and a building as large as 330,000 square feet, sources said. Although the plan received the endorsement of the Los Angeles corporation's top management, the final decision on what is built rests with Hughes' board of directors. Richard Dore, a Hughes spokesman, said the directors were scheduled to meet in early November. "They still have to say 'yes' before it occurs," he added.....[Hodges. TODAY, pp. 1A & 16A, Sep. 22, 1983.]

September 22: Hughes Communications, Inc., successfully launched its Galaxy II satellite aboard a Delta rocket at 6:16 p.m. EST from Pad 17A at Cape Canaveral Air Force Station. The vehicle was visible for just 12 seconds after engine ignition due to the heavy cloud cover over the launch site. That cloud cover also helped focus the rocket's engine noise so that it was an especially loud one to observers on the ground. The Galaxy spacecraft, built by Hughes Aircraft for the company's wholly owned communications subsidiary, will serve the telecommunication needs of large corporations, long-haul carriers and broadcasters. One-half of the satellite's 24 transponders already have been sold to MCI Communications Corp. for use in an industrial educational network. Programs to be carried on the network will be televised to employees and customers for such purposes as internal communication and product familiarization. A portion of one transponder has

been bought by IBM for that company's business communication needs, and the remainder of the craft's capacity is for sale. [Yacenda. TODAY, pp. 1A & 16A, Sep. 23, 1983.]

September 23: NASA had instituted a new space shuttle launch designation system effective October 1 to replace the former simple numbering system (STS-1, STS-2, etc.) Under the new system, each shuttle launch will be designated by a three-tier system, with the first number standing for the fiscal year (e.g., fiscal 1984, "4"); the second number for the launch site, with Kennedy Space Center designated "1" and Vandenberg AFB "2", and the third, a letter corresponding to the launch number of the flight for that fiscal year from a launch site (e.g., "A" for the first flight of the year, "B" for the second, etc.) The change is said to reflect concern over the confusion caused by postponement of flights such as the STS-10 DOD mission, and avoidance of an STS-13 or future "13's." ["NASA Institutes New (Confusing) Shuttle Launch Designation System," DEFENSE DAILY, p. 104, Sep. 23, 1983.]

<> All Kennedy Space Center firefighters who participate in picket lines against EG&G will be suspended from their jobs and may be fired after administrative hearings, according to EG&G and union officials. Twenty-five more KSC firefighters have been targeted by EG&G for suspension from their jobs, said Transport Workers Union Local 525 President Sam Runion. Thirty-one of the company's 85 firefighters have been staging "informational demonstrations" each morning since Sept. 21st. Runion said TWU International Vice President George Roberts was told Sept. 22 about 25 upcoming suspensions by EG&G Labor Relations Director Jim Walton. At least three firefighters were suspended from duty on the 22nd, Runion said, and hearings that may result in firing the men are scheduled for today (Sept. 23). EG&G spokeswoman Shirley Kidd, reading a statement from EG&G management, said all verified participants in the KSC gate picket line will be suspended. "TWU Local 525 has a contractual obligation not to strike, picket or demonstrate against EG&G Florida during the term of the agreement, which does not expire until December 31, 1984." Kidd said. Runion said EG&G was "trying to take our constitutional rights away from us" by suspending those who are protesting during off-duty hours. "Our legal adviser says we are within our legal rights," Runion said, adding legal action is being studied to force EG&G to return the firefighters to their jobs. However, Kidd said, "There is no legal justification for setting up picket lines. EG&G Florida will use its best efforts to attempt to resolve differences with TWU within the terms of the contract and applicable labor laws." [Crook. TODAY, pp. 1B & 3B, Sep. 23, 1983.]

September 26: Lockheed Space Operations Co., which won NASA's \$6 billion space shuttle processing contract, was judged better than Rockwell Shuttle Operations, Inc., in eight of ten mission suitability areas, according to a NASA debriefing report made following the award. NASA said that Lockheed's primary strength was in its management approach, with clear lines of responsibility and authority for each processing function and Lockheed always in charge. Rockwell's horizontal management approach was called "unsuitable for effective and efficient shuttle processing operations." The matrix management in Rockwell's proposal was perceived by the source evaluation board as a weakness. In it, personnel from four different companies in the Rockwell team would be intermixed at all levels within the work force, and there would be "extensive utilization of committees in management activities." One NASA official, who said the competition "wasn't close," commented that the agency was puzzled by Rockwell's decision to propose matrix management.

The NASA debriefing paper was signed by Administrator James M. Beggs and had the concurrence of Hans Mark, deputy administrator, and Lt. Gen. James A. Abrahamson, associate administrator for space flight. Beggs said the evaluation board rated Lockheed as "good" or "very good" in all categories with an overall rating of "very good" in mission suitability. Rockwell received ratings of "poor" to "very good" in mission suitability. Mission suitability was one of four evaluation categories used to rate the two proposals. Others were cost, experience and past performance. Mission suitability carried the most weight and involved the bidders' management and technical operations master plans and parent company commitments of corporate resources. [Kolcum. AVIATION WEEK & SPACE TECHNOLOGY, pp. 28-30, Sep. 26, 1983.]

September 28: Space shuttle Columbia rolled out of the Vehicle Assembly Building shortly before noon (EDT) for its 3 1/2 mile trek to launch pad 39A. Columbia arrived at the pad just after 5 p.m. (EDT). At 6:08 p.m. (EDT), Columbia and its launch platform were secured to the pad pedestals and crews began the task of hooking up electrical, mechanical and fluid supply lines, and checking them. The shuttle's transfer from the VAB was delayed while mission managers analyzed data detailing "excessive erosion" on nozzles in the solid rocket boosters used by Challenger in the previous shuttle flight, STS-8. That, coupled with a report that the nozzle in the right booster on Columbia had a defect, raised some concern among officials and set back the shuttle rollout, originally set to start at 7:30 a.m. "The extra

time was used for project managers to give further consideration to the booster problem," KSC spokesman Jim Ball said. KSC officials spent the night of the 27th and most of the morning of the 28th inspecting the shuttle's two boosters for defects, Ball said.

"We had what was first described as a crack in the protective wall lining the nozzle," he said. "It turned out to be a superficial machine mark that was easily repaired with some light sanding." While Columbia appears in good shape now, mission managers are analyzing data showing the carbon lining on the inside walls of the nozzles of the boosters used on STS-8 showed "excessive erosion." "We went ahead with the rollout but that doesn't mean the issue of the boosters has gone away," Ball said. Mission managers haven't determined whether the boosters will have to be modified or if that work could be done on the pad, Ball said. [Stanley. TODAY, p. 12A, Sep. 29, 1983.]

September 29: Only 16 of the thousands of NASA employees now working at KSC have been on the job continuously since the space agency opened its doors on October 1, 1958. Those 16 were honored with certificates and commemorative pins at a special anniversary ceremony at the space center's training auditorium. Making the presentations was center director Richard Smith, who also summarized major events of the agency's first quarter-century. The 16 honored are: William S. Brosier; T. Bradley Curry, Jr.; William R. Dennis; H. Jack Grames; Charles J. Heckelmoser; Charles R. Hudecek; William F. Huseonica; John Janokaitis, Jr.; Edward S. Lesky; John J. McDonough; William R. Meyer; Hollis H. Neal; William D. Nowlin; William T. Sleeman; Michael A. Wedding; and Alfred N. Wiley, Jr. Until the 28th, center officials believed that only seven KSC employees had been with the agency since its inception, but an amended computer check revealed nine additional such individuals, KSC chief spokesman Hugh Harris said. NASA Administrator James M. Beggs, appearing on videotape at the ceremony to present a specially prepared anniversary message, called NASA's first quarter-century of achievement "just the beginning."

"We did not get to our present position of leadership in space by accident," he said. "We got there because we had the imagination to dream great dreams and the national will to fulfill them." Beggs, NASA Administrator since July 1981, cited a partnership of government, industry and university built up over the years, for NASA's scientific and high-technology base, which he termed, "second to none." Beggs used the occasion to praise the space shuttle and to

lend support for the development of a space station, a leading theme for the agency chief. Part of the ceremony was presentation of a plaque by the National Institute of Electrical and Electronic Engineers recognizing the contributions of NASA and NASA contractors to the electrical and electronics engineering fields. The presentation was made by Rudolph Stampfl of the IEEE's Aerospace Electronics Systems Society. [Yacenda. TODAY, p. 16A, Sep. 30, 1983.]

OCTOBER 1983

October 1: President Reagan issued a proclamation commemorating the 25th anniversary of the National Aeronautics and Space Administration, noting that the agency pioneered a space partnership that could serve as a model to others on how the different sectors of American society can work together.

The proclamation said in part: "America is justifiably proud of its accomplishments in aeronautics and in space research. In the 25 years since the National Aeronautics and Space Administration (NASA) was created by an Act of Congress, our country and the world have witnessed an unsurpassed record of scientific and technical achievements which has established the United States as the world leader in aerospace research and development...

"The government-industry-university partnership, pioneered by NASA, has worked exceedingly well in aerospace research, providing a model to others on how the different sectors of American society can work together. This effort reflects America at its best: peacefully seeking knowledge and enlightenment, advancing technology for mankind's benefit, and organizing resources to accomplish great missions."
["U.S. Space Program: Model for American Society," DEFENSE DAILY, p. 155, Oct. 4, 1983.]

<> The crew of the Columbia successfully completed a simulated launch in preparation for the real thing on October 28th. "This was the best test I've ever seen and I've been around a long time," said STS-9 commander John Young, a veteran of five space flights including the first shuttle mission. "We're ready to fly," Young said, adding he doesn't expect any major complications when it comes time to land Columbia with its 12-ton payload - the Spacelab - aboard. "While the mission is totally different from STS-1, many of the maneuvers will be pretty much the same," Young said. The mock firing of the shuttle's main engines came right on time at 11 a.m. EST, ending a dry run of prelaunch activities for the six-member crew. The astronauts - including Young, pilot Brewster Shaw, mission specialists Robert Parker and Owen Garriott and payload specialists Byron Lichtenberg and Ulf Merbold - were awakened at 6:40 a.m. EST. Boarding Columbia around 8:30 a.m. EST, the crew spent 2 1/2 hours aboard the spacecraft. After the simulated rocket ignition, the astronauts participated in emergency training procedures.

Meeting briefly with the news media at launch pad 39A following the morning's activities, the crew appeared relaxed and eager to get into space as they posed for a group picture in front of the complex. "I'm anxious to proceed," Garriott said. "The Spacelab is ready, the experiments are ready and I'm looking forward to working on them." Merbold, a West German scientist who will be the first European to go into orbit aboard an American spacecraft, said he hasn't found it difficult to mesh with his crew members. "I'm very proud to be part of this whole experience," Merbold said. "Americans aren't so much different than any other people." "I'd have to echo Ulf's comments," said Lichtenberg, who also is a scientist making his first trip into orbit. "I'm eager to go and I'm looking forward to doing some good science up there." [Stanley. TODAY, p. 20A, Oct. 2, 1983.]

October 3: NASA is shifting \$3.45 million from its FY '83 space shuttle budget for site preparation for a new solid rocket assembly and refurbishment facility at Kennedy Space Center. The new facility is needed because the existing facility "is not economically expandable" to provide SRB's for more than 16 flights per year, while the mission model calls for up to 24 flights a year in later years. The new facility is to be built by the contractor selected for SRB processing, which is being recompeted. The new facility is to be in operation in time to produce the SRB flight articles for the 38th space shuttle flight, which is scheduled for mid-1986. Funds will be transferred from Shuttle Changes & Systems Upgrading (\$3 million) and Shuttle Orbiter Production (\$0.45 million). ["NASA Shifts \$3.5 Million from Shuttle to SRB Facility," DEFENSE DAILY, p. 151, Oct. 3, 1983.]

October 4: NASA's Kennedy Space Center awarded Industrial Steel, Inc. (Mims, Florida) a contract for a proofload adapter, to be used for processing the space shuttle. The fixed-price contract was valued at \$34,859 and was one set aside for award to a small business firm. The contract was initiated on September 15 and date of delivery is December 14, 1983. A proofload adapter is a structure that weighs more than a shuttle orbiter, and is used as a testing device to prove the Orbiter Mating Sling can safely hold the orbiter's weight during the mating process. [Malone. NASA/KSC NEWS RELEASE No. 237-83, Oct. 4, 1983.]

<> Kennedy Space Center awarded a \$2,120,552, one-month contract extension to Planning Research Corporation (McLean, Virginia) for design services in support of space shuttle operations at KSC. Under terms of the cost-plus-fixed-fee contract, PRC will continue to design ground systems and equipment in support of the shuttle orbiter and its payloads at KSC during the Shuttle Processing Contract (SPC) transition period. The contract covers the period from October 1, 1983, through October 31, 1983. [Tucker. NASA/KSC NEWS RELEASE No. 238-83, Oct. 4, 1983.]

October 5: NASA's John F. Kennedy Space Center awarded Planning Research Corporation (PRC) (McLean, Virginia) a new contract, valued at \$37,692,455, to provide engineering services for the Directorate of Engineering Development at the Kennedy Space Center, and at Vandenberg Air Force Base, California. The cost-plus-fixed-fee contract was initiated on October 1, and will extend through December 31, 1985. Under the terms of the contract, PRC is responsible for designing ground support systems for the Shuttle Centaur program. The Shuttle Centaur will be used to inject space vehicles into an interplanetary trajectory after deployment from the space shuttle. [Malone. NASA/KSC NEWS RELEASE No. 239-83, Oct. 5, 1983.]

<> NASA's Kennedy Space Center awarded Boeing Services International, Inc., (BSI) (Kennedy Space Center, Florida) two contract extensions in support of the shuttle processing contractor's transition period. One contract is for supply and transportation services and the other is for ground support operations. The contract for supply and transportation services was initiated October 1, and will extend through October 31, 1983. The dollar value of the one-month contract is \$2,532,269, which brings the cumulative value of the parent contract to \$80,361,248. Under the terms of this contract, BSI will manage and perform supply support operations and services, transportation management and planning, and purchasing support for these operations. The contract extension for ground support operations, valued at \$6,429,623, was initiated October 1, and will extend until November 30, 1983. This brings the cumulative value of the parent contract to \$337,856,876. Under this contract, BSI provides facility and utility operations and maintenance, including doors and platforms, elevators, cranes, service shops, miscellaneous electrical and mechanical systems, and water deluge and distribution systems in support of shuttle related operations. The shuttle processing contractor,

Lockheed Space Operations Company, is expected to take over the duties of these cost-plus-fixed-fee contracts on or before the expiration date. [Malone. NASA/KSC NEWS RELEASE No. 240-83, Oct. 5, 1983.]

<> Potential problems with the shuttle's twin solid rocket boosters might postpone the shuttle's impending launch and the debut of Europe's Spacelab. Tests are now under way to determine the existence and nature of any potential problems, and program chiefs expect to decide by late next week whether to order the shuttle removed from the pad. Two possible problems, both associated with the exhaust nozzles on the reusable boosters, are being studied. The most serious concern stems from abnormal nozzle wear discovered on one of the solid rockets used during the eighth shuttle launch August 30. Engineers so far have been unable to explain what caused the wear, never seen before on previous missions. Also, patches of silicon oil found on one of the boosters now on the pad have engineers puzzled. "We have a question right now about the booster nozzles," said NASA Shuttle Operations Manager Tom Utsman. "But it's premature to talk about removing it (the shuttle) from the pad." Utsman confirmed, however, that removing the shuttle - poised atop pad 39A since September 28 - is one of the options program officials are considering. Consideration is being given to speeding up assembly of a shuttle "stack" that would be used for shuttle mission 11 planned for January, and putting the Columbia and its Spacelab cargo onto that stack. "We're making contingency plans. It's a matter of covering all the bases. If things aren't satisfactory, we're just not going to launch," Utsman said. He also said that patches of ablative, or protective, coating on the inside nozzle surface of one of the mission 8 boosters had worn to just two-tenths of an inch thickness. At that thickness, engineers estimate the rocket's searing exhaust could have burned through the nozzle in just eight more seconds of burn time. Utsman said he didn't know what would happen if burn-through occurred. "That's one of the classic bad cases," he said. "What made one different? It doesn't mean that the ones out there [boosters on the pad] are bad," Utsman said. Alan Thirkettle, who is in charge of the Spacelab project at Kennedy Space Center for the European Space Agency, said he is unsure about what will happen if a problem with the boosters is confirmed. "We're resting on the assumption that NASA is going to solve our problems for us and the only thing that will stop us from going on the 28th is cloud cover," Thirkettle said. "We're very, very ready to go." Thirkettle said the biggest concern facing Spacelab officials is the loss of science opportunities that any delay in Spacelab's launch could cause. The mission already has been delayed a month because

of shuttle scheduling problems. Morton Thiokol, which manufactures the booster rockets at its Brigham City, Utah, plant plans to conduct test firings of booster components during the weekend. NASA officials hope to gain added information on the potential wear problems based on these firings. "We're going to push on down the road and sometime late next week we'll really start putting the story together," Utsman said. Asked if launch officials were taking a conservative approach, Utsman replied: "I wouldn't call it a conservative approach. It's the only approach you can take in a manned space program." [Yacenda. TODAY, pp. 1A & 20A, Oct. 6, 1983.]

October 6: Continued uncertainties about the health of the shuttle's solid rocket boosters kept space program officials examining the problem. Faced with the last-ditch prospect of postponing the scheduled October 28 launch of the Columbia and its Spacelab cargo, program managers met at the three major NASA flight centers as well as at the contractor corporation where the boosters are built. The manufacturer, the Wasatch Division of the Thiokol Corp. (Brigham City, Utah) plans to run a series of test firings of the rocket boosters during the weekend in an attempt to determine the extent of the problem possibly afflicting the boosters. A decision on whether a problem exists will be made based on the results of those tests and other investigations now under way. That decision, which will determine whether Columbia will be allowed to fly on time or will be brought back from the launch pad where it now stands, could come as early as October 10, a Thiokol source said. The decision would be made by officials in charge of the solid rocket booster program at the Marshall Space Flight Center in Huntsville, Alabama. Two separate concerns have surfaced about the boosters' safety, both involving the engine exhaust nozzles that funnel out the twin rockets' 2.7 million pounds of thrust. The more serious problem was one discovered shortly after the last shuttle mission in August, when engineers found that the protective lining on one of the mission 8 shuttle's solid rocket exhaust nozzles was worn precariously thin in spots. The other problem that has officials baffled concerns the presence of silicon oil on the nozzle lining. That oil, which has been seen on other boosters, was found in relatively large quantities on one of the boosters slated to help launch the Spacelab 1 shuttle mission. If officials order Columbia back from the launch pad, a minimum delay of a month - and possibly up to four months - is envisioned. Such a delay could cause serious problems for many of the 70-plus scientific investigations planned for the \$800 million European-developed orbiting laboratory, European Space Agency officials say. [Yacenda. TODAY, p. 20A, Oct. 7, 1983.]

October 7: NASA's Kennedy Space Center and BAMSI, Inc. (Titusville, Florida) signed a \$1,505,016 contract for BAMSI's first two years as Base Operations Contractor at NASA's Space Transportation System resident office at Vandenberg Air Force Base, California. The award, which is one set aside for a disadvantaged firm, is the largest single award NASA has made to a minority firm, including options contained in the contract, during Fiscal Year 1983. The Base Operations Contract (BOC) covers such functions as administrative services, facilities, graphics, and technical operations in the instrumentation and communications areas. The cost-plus-fixed-fee contract will be for an initial period of two years, covering the period from October 1, 1983, through September 30, 1985. Also included in the contract is one priced option for 1986, valued at \$693,601, and two one-year, unpriced options for 1987 and 1988, for a total potential contract period of five years. The services to be performed by BAMSI under the new contract were previously performed by Mercury, Inc. [Tucker. NASA/KSC NEWS RELEASE No. 241-83, Oct. 7, 1983.]

<> Kennedy Space Center awarded International Business Machines Corp. (Cape Canaveral, Florida) an addition to an existing contract for systems engineering and software development services in support of the Space Shuttle Launch Processing System. The cost-plus-award-fee contract addition is valued at \$3,285,200, which brings the total value of the original contract to \$91,637,404. This contract addition was initiated in April 1983 and will extend through September 30, 1984. Under conditions of this contract, IBM will develop LPS software that can be integrated with the future replacement computer system. [Malone. NASA/KSC NEWS RELEASE No. 242-83, Oct. 7, 1983.]

<> NASA's Kennedy Space Center solicited sources for a study to evaluate the state-of-the-art capability of computer hardware and software to be used to perform space station operations simulation and modeling. The contractor will review the literature for the overall space station simulation operational environment, identify the functional requirements for direct ground support operations, and define the necessary parameters of the computer system (hardware and software) required to emulate the operational environment. The study's objective is to determine the feasibility limitations and develop a "strawman specification" for the hardware and software to implement and support the simulation models, and provide estimates for the time and cost to acquire and implement the proposed system. ["Kennedy to Study Computers for Space Station Simulation," DEFENSE DAILY, p. 182, Oct. 7, 1983.]

October 9: While the two solid rocket boosters that helped put the Challenger into space in August were undergoing a critical exam in Utah over the weekend, preparations continued for the October 28 launch of Spacelab 1 aboard Columbia. Crews were working toward a simulated countdown test scheduled for October 10. Rocky Raab, a center spokesman, said the simulation would test Columbia's external fuel tank by actually filling it with supercold liquid fuel. He said the mock countdown also would test the shuttle's onboard electrical power-supply cells as well as the hydraulic system. The launch of the European-built orbiting laboratory depends on the findings of the team investigating the boosters, Shuttle Project Manager Bob Lindstrom said. ["Countdown to Test Shuttle's Readiness," THE ORLANDO SENTINEL, p. B-2, Oct. 10, 1983.]

October 10: Dr. Kurt H. Debus, a World War II German rocket engineer who watched the U.S. space program grow from a few captured V-2s to a fleet of sleek shuttles, died in Cocoa Beach, Florida, after a heart attack. He was 74. Debus was the first director of the Kennedy Space Center, and it was at least partly his decision that America's spaceport be on Florida's Atlantic coast instead of in Georgia or the Caribbean. When he came to Florida's mosquito-ridden marshes in 1952 to prepare the first launch of the Army's Redstone ballistic missile, Debus and his colleagues worked in motel rooms and restaurants until sweltering quonset huts were set up as temporary offices. When he stepped down as space center director in 1974, after breaking ground on a space shuttle landing strip, he had overseen up to 26,000 space workers and had been in charge of 295 rocket launches. He retired with his wife, Irmgard, to a Cocoa Beach waterfront home from which he could watch his beloved spacecraft climb into the sky. Debus's friend and mentor, the late Dr. Wernher von Braun, once said of him, "We develop the rockets and the contractors build them. And then it's up to Debus to make them work."

"He had an encyclopedic knowledge" of rocketry and spaceflight, said Gordon Harris, former NASA spokesman. "He had to. He had to check on other people's mistakes." "I appointed him personal guardian of our quality," said the Rev. John Bruce Medaris of Maitland, a former Army major general who headed the space program while Debus was at the space center. "I enjoyed working with him. He listened well and he had a good sense of what would go and what wouldn't." Harris recalled being with Debus in the blockhouse on January 31, 1958, the night Explorer 1, the first U.S. satellite, was launched, as well as in the launch control center on July 16, 1969, the day three men blasted



Dr. Kurt H. Debus (1908-1983), first KSC Director, died October 10, in Cocoa Beach, Florida, after a heart attack. He was 74. In this May 28, 1964, photograph, Debus studies the booster performance boards following the launch of the SA-6 booster.

off on the mission to land on the moon. There's no doubt which event is more famous in people's memories and in history books. But for Debus, Harris said, the tiny Jupiter C rocket that boosted Explorer 1 carried more weight. "My recollection is that he still thought Explorer was the bigger of the two. At the time, it was more thrilling," Harris said. A few seconds before the tiny satellite was launched, Medaris recalled, the chief of the launch crew called out a warning that something was wrong. "Kurt looked at me. I just felt it was a bad signal. He raised his eyebrows and I said go, and we went ahead and ignored it and it went off fine."

For Debus the excitement had begun decades before. As a young boy he watched, fascinated, as the newfangled airplanes took off near his home in Frankfurt, Germany, where he was born in 1908. Debus studied electrical theory and techniques at Darmstadt University, where he earned his doctorate and later became assistant professor.

In 1937, he married Irmgard, a dental assistant, and the couple had two daughters - Siegrid, now of Satellite Beach, Florida, and Ute, of Washington, D.C. Harris said Debus was "pressured" by the Nazi government after the start of World War II to join von Braun and other German scientists developing transcontinental rockets at the Baltic port of Peenemunde, where he became chief test engineer. The lethal V-2s he helped build blitzed London, Antwerp and other European cities with their swiftly delivered loads of high explosives. After the war, von Braun led more than 100 scientists, including Debus, in surrendering to the Americans. The group was brought to the United States to begin the U.S. space program, which started with the firing of dozens of unused V-2s from proving grounds at White Sands, New Mexico. Later Debus was transferred to Alabama to test the Redstone, the Army's first ballistic missile, which could carry a nuclear warhead about 200 miles. "At the time I had absolutely no idea of the importance of the rocket to the future of mankind," Debus said in 1974. "It was a brand new field, with a sense of importance, and we were developing our own technology as we went along." The hours were long and the pay was low. "We were hanging by our teeth in the early years," Debus said. "The government was always threatening to cut us off."

In 1952, Debus got his first look at Cape Canaveral, the rattlesnake-infested and marshy spit off Florida's east coast. He was named director of operations of the Missile Firing Laboratory of the Army Ballistic Missile Agency, NASA's predecessor. The next year, he came back with

several dozen Army scientists and technicians to fire the first Redstone. His office was a restaurant table. "We were a circus troupe," he recalled. The space agency was considering Cumberland Island in Georgia and several Caribbean islands, as well as the Cape, as potential locations for its major launch site. Debus pushed Brevard County because "there was a community here that could absorb the increased population that he knew was going to come," Harris said. In addition, there already was an Air Force station and missile testing range at Cape Canaveral.

Besides the first satellite launch, Debus watched over the Mercury manned spaceflights, the two-astronaut Gemini missions with their spacewalks, the Apollo moon voyages and the Skylab program. One of his last acts as space center director in September 1974 was to turn over a shovelful of dirt for the future space shuttle landing strip on Merritt Island. Then he and Irmgard, nicknamed Gay, returned to their home, where he could watch the space shots through binoculars, just as he had done from the blockhouse during the first launches. Harris said Debus was always enthusiastic about the space shuttle but dreamed that he would see humanity establish an outpost on the dark side of the moon to listen to signals from the stars. "He believed that there was life out there," Harris said. "It is a great loss," former astronaut John Glenn, a presidential candidate, said in Tallahassee. Glenn, who became famous as the first American to orbit the Earth, said Debus was "a fine man and he did great work over there."

In an official statement, Dick Smith, current director of Kennedy Space Center, called Debus "a trailblazer." His contributions to the U.S. space program cannot be overemphasized. He brought a quiet, personal genius to this demanding work, Smith said. "His was a creative mind which conceived of the needs of a NASA launch center for decades to come, and it was under his direction that concepts and blueprints were transformed into the spaceport which we find so valuable a national asset today." [Susskind. THE ORLANDO SENTINEL, pp. 1A & 7A, Oct. 11, 1983.]

October 11: After a two-hour delay caused by a leak in a hydrogen fuel-supply system, technicians took the Columbia through a simulated countdown to within 31 seconds of launch. The test, called a "wet countdown" because fuel tanks were filled, was designed to test all non-astronaut launch functions except for the actual engine firing, said center spokesman Rocky Raab. The test was completed at 2:35 p.m. EST. Columbia's tanks were to be loaded with

liquid hydrogen and oxygen for the test, but because of a leak in an 8-inch hydrogen supply line, technicians filled only the oxygen tank with the supercooled liquid. The hydrogen tank was pumped full of gaseous hydrogen. Initial reports blamed the leak on a faulty seal. ["Shuttle Rehearses for October 28 Launch," THE ORLANDO SENTINEL, p. B-2, Oct. 12, 1983.]

<> A series of small rocket test firings conducted in Utah during the weekend indicate the impending launch of the Columbia and its European Spacelab cargo almost certainly would be scrubbed, space program officials confirmed. Concern about the safety of the shuttle's twin, reusable solid rocket boosters arose after the last shuttle flight in August, when patches of dangerously high wear were detected on one of the linings that protect the rockets' exhaust nozzles from the heat of engine ignition. Officials confirmed that one of the two boosters now part of the shuttle vehicle on pad 39A has a nozzle lining of the same lot as the one on the last flight that nearly burned through because of the abnormal wear. Some of the materials used in manufacturing that lot of linings are now considered suspect, sources said. Booster program managers refused to categorize the suspect materials as a bad lot, preferring to term them "questionable" until results of further tests are in. The tests, which use small, 40-pound solid rocket motors, were conducted by the boosters' manufacturer, the Wasatch Division of the Thiokol Corp. (Brigham City, Utah). Several high-ranking space officials, including James M. Beggs [NASA Administrator] met at Thiokol headquarters to discuss the booster problem. Joining the discussion by teleconference line were program managers at KSC, Marshall Space Flight Center in Huntsville, Alabama, Johnson Space Center in Houston, Texas, and NASA headquarters in Washington, including shuttle program chief James A. Abrahamson. Thiokol's shuttle booster program chief, Joe Kilminster, said test results so far show one "marginal" lot of booster lining materials that were supplied by a single subcontractor; Kilminster declined to identify the subcontractor. "We're looking for further confirmation that some of the materials used in these boosters have some properties that are undesirable," Kilminster said. NASA booster program chief Bob Lindstrom, said by telephone from Utah that different types of tests than those previously run were planned for October 12 and that still more testing beyond then remained a possibility as well. Knowledgeable sources said preliminary preparations were already underway to roll the shuttle back from the pad on October 14 and replanning and reprogramming of many of Spacelab-1's complex scientific payloads had begun as well. [Yacenda. TODAY, pp. 1A & 12A, Oct. 12, 1983.]

October 12: International Business Machines Corp. (Cape Canaveral, Florida) has won a \$3.2 million NASA contract for systems engineering and software development services to support space shuttle launch operations at Kennedy Space Center. NASA has also awarded Brown and Associates Management Services Inc. (Titusville, Florida) at \$1.5 million, two-year base operations contract at NASA's Space Transportation System office at Vandenberg Air Force Base, California. [Kassak. TODAY, p. 14C, Oct. 12, 1983.]

October 13: The brains and the backbone of America's space effort gathered at Patrick Air Force Base to honor the memory of Dr. Kurt H. Debus, the German rocket expert and space pioneer who died October 10. Debus, who was known primarily as the architect of the Kennedy Space Center launch site and who served as the center's first director from 1961 through October 1974, died of a heart attack at the age of 74. In eulogizing Debus, Rocco Petrone, a 31-year associate of Debus and now head of Rockwell International's space program, called him "a leader and team builder...truly a visionary." About 180 people, including many retired space veterans and others still with the nation's space program, filled the Capehart No. 2 Chapel at Patrick's South Base Housing area to commemorate Debus, who was a Cocoa Beach resident since his retirement from NASA in 1974. A procession of 55 cars that stretched for a mile followed as Debus's body was moved following the 10 a.m. service to Florida Memorial Gardens south of Rockledge, where interment took place. NASA provided a bus to carry several agency officials, including some who had come from Washington, D.C. to attend the funeral.

The list of those attending the ceremony read like a "who's who" of the nation's space program. Among the many pioneers there were people like Karl Sendler, the last remaining member of the team of five German scientists including Debus that helped set up the Army's first launch facilities at Cape Canaveral in the early 1950s, and Gordon Harris, former KSC public information director and Debus's close friend. Also present were Ray Clark, a NASA engineering director under Debus; G. Merritt Preston, who headed the Gemini program during Debus's administration; Walter Kapryan, longtime launch director throughout the period that encompassed the Mercury through the Skylab manned space flight programs and who is now with Lockheed Space Operations; Grady Williams, KSC design engineering director serving under Debus; and engineers Isom "Ike" Rigell, Peter Minderman and Bob Murkshe. Apollo 13 astronaut Fred Haise, now president of Grumman's new shuttle processing operation, also was in attendance, as were KSC Deputy Director George

Page, KSC Executive Staff Director George English, NASA Associate Deputy Administrator Philip Culbertson, KSC Public Affairs Director Charles Hollinshead, KSC Personnel Director Ben Hursey, and many other active and retired space agency figures. Dr. Paul Allen, a Baptist minister and a friend of Debus's daughter Siegrid, presided over the services.

Debus, who had been in ill health almost since the time of his retirement, suffered from kidney and other disorders in his last years. The family asked that donations be made in Debus's name to the Brevard Kidney Center, 375 S. Courtenay Parkway, Merritt Island, Florida. [Yacenda. TODAY, pp. 1A & 12A, Oct. 14, 1983.]

October 14: Suspected defects in a solid rocket booster nozzle lining caused NASA officials to postpone the planned October 28 launch of the Columbia and its Spacelab cargo. No new launch date was set for the mission, ninth in the shuttle program, but officials said the earliest it might fly would be November 28. Depending on an evaluation of the delay's impact on Spacelab's scientific mission, the launch could be delayed until late February. For the first time ever in the shuttle program, the launch vehicle will be rolled off the Kennedy Space Center pad where it now stands and returned to the Vehicle Assembly Building for repairs. Rollback is expected to begin at 8 a.m. EST on October 17.

Officials decided to replace only the rear segment of the one booster containing a nozzle lined with protective material from the same batch as one that nearly burned through during the last shuttle flight in August. But to accomplish that, virtually the entire shuttle vehicle - including the orbiter, the external tank and the one suspect booster - must be broken down and then reassembled. Only the other booster, which has a nozzle lining from a different batch not believed to be defective, will be allowed to stand during the operation. Officials of the European Space Agency, which developed and built Spacelab, concurred with NASA's decision. "A new date for the Spacelab mission will be based on obtaining full confidence in the SRB nozzles and an evaluation of the science requirements for the Spacelab experiments," NASA's official announcement said. The head of the European Space Agency's Washington's office, Wilfred Mellors, said ESA had no immediate statement on the delay. "I don't think we have a reaction yet. All the top people are asleep in Europe at the moment. We'll be disappointed, but clearly it's something that couldn't be avoided," Mellors said.

While booster restacking proceeds, Columbia will be returned to a nearby orbiter processing hangar where its scientific payload can be serviced. The shuttle should be back in the hangar by midnight October 19, KSC chief spokesman Hugh Harris said. With Columbia occupying one of KSC's two processing hangars and Challenger, Columbia's younger sister ship, filling the other, the planned arrival of NASA's third shuttle at KSC on October 21 has been postponed. The new ship, Discovery, will remain at Rockwell International's Palmdale, California, factory until at least November 4, Harris said. Discovery's first flight isn't scheduled until May 7 at the earliest. [Yacenda. TODAY, pp. 1A & 8A, Oct. 15, 1983.]

October 15: Perhaps the most unique contribution which Dr. Kurt H. Debus made to this community and the national space program was the establishment of a visitor's center and daily bus tours of the spaceport. He reasoned the people - without regard to race, nationality, or any other consideration - should have access to Kennedy Space Center in order to witness the engineering marvels which made Apollo possible and paved the way for today's shuttles. He also believed that public interest would translate into continuing support for space exploits of the future. Firmly convinced of the need, he set about persuading NASA and the Congress to open the gates. Millions have responded from virtually every nation on earth. It is a legacy which does honor to its creator and has accrued to the economic benefit of this community. [Gordon L. Harris, (letter to the editor), TODAY, p. 6A, Oct. 15, 1983.]

October 17: NASA moved the Columbia from the launch pad back to the Vehicle Assembly Building at Kennedy Space Center to replace the nozzle and aft section of one of its two solid rocket boosters, a move which delays the scheduled October 28 launch to November 28 at the earliest and possibly to February 27. Associate Administrator Lt. Gen. James Abrahamson said if the rocket had fired another 14 seconds, it would have burned through the nozzle wall. He said that while a catastrophic explosion probably would not have occurred, Challenger probably would have been pushed off course during ascent, forcing an emergency landing back at the Kennedy Space Center launch site. Two recent test firings of a 40-pound small SRB using liner material from the suspect lot produced confusing results when the first liner failed and the second didn't. Columbia is expected to be ready for a return to the launch pad by November 10. ["Columbia Moved Back to VAB After Decision to Replace Nozzle," DEFENSE DAILY, p. 227, Oct. 18, 1983.]

October 19: NASA leaders had hoped that President Reagan would cap their 25th anniversary ceremonies in the National Air and Space Museum with the announcement that he would offer a positive public support for the initiation of the development of a space station. Instead, he said he was not just concerned "about the next logical step in space," but instead was planning "an entire road, a 'High Road'" for the next 25 years of the space agency. "Right now we're putting together a National Space Strategy that will establish our priorities and guide and inspire our efforts in space for the next 25 years and beyond," the President told the NASA gathering. "It will embrace all three sectors of our space program - civil, commercial and national security. The strategy should flow from the National Space Policy I announced July 4th last year," he said. President Reagan said the "High Road" he is planning "will provide us a vision of limitless hope and opportunity, that will spotlight the incredible potential waiting to be used for the betterment of mankind." He challenged NASA "and the rest of America's space community: Let us aim for goals that will carry us well into the next century." The President was critical of those "who preach the doctrine of limited resources. They pessimistically suggest that we are on the way to depleting all of what we have and that slowly the condition of humankind will deteriorate into a Malthusian catastrophe." And he predicted that free enterprise will do for space what it did for aviation. "In this regard, the space shuttle could be compared to the first transcontinental railroad. And when profit motive starts in to play, hold on to your hats, the world is going to see what entrepreneurial genius is all about and what it means to see America get going." ["President Says A 'High Road' In Space Is Planned," DEFENSE DAILY, p. 242, Oct. 20, 1983.]

October 24: Kennedy Space Center awarded Computer Sciences Corporation's Applied Technology Division (Falls Church, Virginia) a contract extension for the continuation of communications and instrumentation support services. This contract is to cover the shuttle processing contract transition period. The cost-plus-award-fee contract is valued at \$4,335,599, bringing the total value of the original contract, since inception in June, 1977, to \$233,228,880. This contract extension covers the period from November 1 through November 30, 1983. The SPC contractor, Lockheed Space Operations Co., will assume duties included in this contract on or before the expiration date. Under the terms of this contract extension, CSC and its subcontractor, RCA Services Company (Cherry Hill, New Jersey) will provide support in the areas of communications, measurements, telemetrics, instrumentation of Launch Control

Center firing rooms, and reliability and quality assurance programs. CSC currently maintains other agreements at KSC that are not related to shuttle processing operations. [Malone. NASA/KSC NEWS RELEASE No. 252-83, Oct. 24, 1983.]

<> Kennedy Space Center awarded Walding Company (Jacksonville, Florida) a \$234,000 contract to resurface a portion of the Kennedy Parkway. The fixed-price contract was initiated October 3 and the resurfacing activity should be completed by January 11, 1984. This award is one set aside for award to a small business firm. Walding will provide labor, equipment and materials to resurface the Kennedy Parkway, the center's main north-south artery, from Gate 2 north to Gate 2C. A bituminous "tack" coat will be applied to prepare the existing road for a 1 1/2-inch uniform surface course of asphaltic concrete. Traffic stripes and directional markings will also be painted on the road under the terms of this contract. [Malone. NASA/KSC NEWS RELEASE No. 249-83, Oct. 24, 1983.]

<> Kennedy Space Center awarded Ortner Freight Car Co. (Milford, Ohio) a \$271,780 contract to modify four rail cars that will be used in transporting the space shuttle's tail cone from KSC to Edwards Air Force Base, California. The fixed-price contract was initiated September 27, and under the terms of the contract, Ortner will ship the rail cars to KSC by January 25, 1984. [Malone. NASA/KSC NEWS RELEASE No. 251-83, Oct. 24, 1983.]

<> Testing procedures revealed a leaky joint between two segments of the shuttle's right-hand booster, but officials said they have experienced similar problems before and think they know how to fix things. In the process of reassembling the booster with a new aft end on October 22, tests showed a leaky connection between the two middle segments of the four-piece rocket, officials said. KSC spokesman Mark Hess said today that engineers planned to take down the uppermost of the ill-fitting segments this evening to clean and inspect the flange and O-ring that lock the parts together. The segments were to be restacked later in the evening and further tests of the connection are planned for October 25. Because of the hitch in the schedule, preparations for a possible November 28 launch of the shuttle were set back about a day, Hess said. "We're potentially one day down as far as SRB stacking goes," said Hess, adding that a late November launch remained feasible because of several days of contingency time incorporated in the time-table. Any delay

past then would delay the flight until late February. Meanwhile, technicians were busy changing out some troublesome equipment aboard the Columbia. The shuttle is back in one of the two orbiter processing hangars while workers restack the rest of the vehicle. Among the equipment in line for recall are the Columbia's No. 3 electricity-producing fuel cell, a key engine component, and the toilet, which remains a residual problem for NASA. [Yacenda. TODAY, p. 16A, Oct. 25, 1983.]

October 25: The leaking joint in Columbia's right-hand solid-fuel rocket booster was repaired, lifting a barrier to the already delayed ninth launch. The last two of five segments of the rocket booster were expected to be in place by noon on the 26th, said KSC spokesman Mark Hess. "That will complete assembly of the rocket, and somewhere around midnight" on the 26th or early on the 27th "we'll lift it up [the external fuel tank] and attach it to the rockets," he said. ["Leaky Booster Joint Repaired," TODAY, p. 20A, Oct. 26, 1983.]

<> At Kennedy Space Center, a working group was recently formed by the Future Projects Office to investigate ways in which some of the latest advances in machine artificial intelligence may be applied to space program uses. "We began looking into this about a year and a half ago and decided it's the coming thing," explained KSC Future Projects Office Chief Dave Moja. The branch of artificial intelligence which has attracted KSC's interest is the field of so-called "expert systems" where the knowledge of a human specialist is codified, or engineered, into a computer program. The human's "expertise" is then available to others who use the machine.

"Humans are fallible. We don't always take all the factors into account. We can forget. We can have a bad day," said Moja. "That doesn't mean machines will replace the human expert. But they can certainly serve as an aid to the human expert." Right now, there are three principal areas that we are working at," said NASA's Carl Delaune, a member of the working group. One of the most promising, he explained, is development of a computer system to serve as "an engineer's advisor" in troubleshooting problems which might come up during the loading of liquid oxygen into the shuttle's external fuel tank. "Discrepancies in any of several hundred measurements of critical parameters can lead to an automatic shutdown of the transfer, and possibly a costly launch delay, unless it is overridden by highly experienced

controllers," said Delaune. Such an override decision by the system experts is based on a detailed analysis of measurements, and it requires knowledge of system hardware and data from previous launches.

"The goal of the artificial intelligence project at KSC is to capture the expertise of the launch team," he explained. A computer system which is able to use that expert knowledge can potentially free up some of the human experts for other activities. It could also be used to help train new launch engineers. Another area to be examined by the working group is in the field of logistics. "The planning and scheduling operation that goes on in the cargo world seems to be a good candidate," said Delaune. The KSC working group is also exploring the possibility that an expert system can be developed to provide reliable 12-hour weather forecasts for the vicinity. "Generally, these systems tend to be very reliable in a limited domain," he said. Delaune used as an example, a Stanford-developed system which can recommend prescription drugs for the treatment of illnesses described by symptoms. "It seems to be better than the people that created it," said Delaune. "It's more consistent than they are. It never forgets any of the things they taught it." Working group members believe that many other potential applications may be identified as a result of KSC's artificial intelligence project. "I can foresee that we'll look into many other possibilities," added Moja. "It's a whole new field." [Ball. NASA/KSC NEWS RELEASE No. 250-83, Oct. 25, 1983.]

<> Ebon Research Systems (Altamonte Springs, Florida) won a \$556,611 contract in support of space shuttle operations at the Kennedy Space Center. The award is one set aside for a disadvantaged firm. The cost-plus-fixed-fee contract calls for Ebon to furnish safety and reliability engineering technical support to the Safety Reliability and Quality Assurance and Protective Services Directorate at KSC. The company will be responsible for performing safety assessments for the shuttle and associated ground support equipment and facilities. Ebon will also conduct safety analysis and reviews for the payloads and experiments which fly aboard the shuttle and will be responsible for submitting reports to KSC's Mishap Reporting and Corrective Action System which serves as a central data base used to study problems and prevent recurrences. [Tucker. NASA/KSC NEWS RELEASE No. 247-83, Oct. 25, 1983.]

October 26: The head of West Germany's space program predicted that a successful first Spacelab mission would stir a groundswell of support in Europe for expanded international cooperation in space. Hermann Strub, head of the Aerospace and Technology Directorate for the Federal Republic of Germany, said he was sure increased European space activity could come from the flight of Europe's orbital laboratory aboard the American shuttle. Part of that future activity, Strub told Today, might be joint American-European development of a manned orbiting space station, with Germany taking the lead in the project in Europe. The delayed Spacelab project is also crucially important to West Germany, which holds a 60 percent share in the facility's industrial development and an even larger stake in the European portion of the laboratory's scientific payload, Strub said.

Strub made his remarks at the University of Central Florida in Orlando, Florida, where his visit was keyed to a different kind of launch, that of a new German Studies Center on the campus. Strub said he expects a decision on the launch to be made November 2 when NASA Administrator James M. Beggs and European Space Agency Director Eric Quistgaard confer by telephone. "My impression is that NASA is doing its best," Strub said, noting that Europeans understand delays because they've had problems with their launcher, the Ariane rocket. [Yacenda. TODAY, p. 2B, Oct. 27, 1983.]

October 30: Two Kennedy Space Center employees and six federal law enforcement officers were honored by NASA this week for their work on an investigation that led to fraud charges against two space center contractors. Randall West of NASA's Office of the Inspector General announced that the special recognition awards had been given to Charles Green and James Reddick, NASA space center employees; FBI agents Allen Bilski, Dennis Hall and Steven Salmari; and Edwin Tomko and Robert W. Merkle of the U.S. Department of Justice's fraud division. Robert H. Waller, a Cocoa FBI agent, was given the Distinguished Service Medal as lead agent in the case. The three-year investigation ended in December 1982 with the conviction of Capital Communications Corp. of Milwaukee and New World Construction of Titusville, Florida, for submitting false claims to NASA for work involving the space shuttle. Also convicted were James T. White, Jr., former New World Construction employee; Philip Akwa, president of Capital Communications; and Arthur Boschen, president of New World Construction. ["NASA Honors 8 Men for Fraud Investigation," TODAY, p. 2B, Oct. 30, 1983.]

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November 2: Kennedy Space Center awarded ACL-FILCO Corp. (Santa Ana, California) a contract worth \$535,863 for hydraulic equipment to be used in support of the shuttle program. The fixed-price contract also includes an early delivery incentive of \$7,800, providing delivery of a solid rocket booster hydraulic control unit is made before December 12, 1984. The contract covers the period beginning October 18, 1983, through March 31, 1985. ACL-FILCO will build a new hydraulic control unit to be installed on the third Mobile Launcher Platform (MLP) which will connect with the Launch Processing System (LPS) during pre-launch checkout. Also included in this contractual agreement are modifications to be made to a hydraulic pump unit for use on MLP-3, and flex hoses for the fluid distribution system of the solid rocket boosters and orbiter. [Malone. NASA/KSC NEWS RELEASE No. 258-83, Nov. 2, 1983.]

<> Kennedy Space Center awarded Symetrics Industries, Inc. (Melbourne, Florida) a \$118,035 contract for Operational Telecommunications Units to be used in the Launch Processing System. The fixed-price contract was initiated on October 3, 1983, and Symetrics is due to deliver 31 OIS (type 54) units by April 3, 1984. This award is one set aside for award to a small business firm. Symetrics will fabricate the communications units from a NASA design. The units will permit operator access to eight audio channels and over 100 communication lines at one time. The new units will supplement existing OIS units. As many as 1,800 persons can have access to this multi-usage communications system, which is an integral part of space shuttle pre-launch checkout and launch operations. [Malone. NASA/KSC NEWS RELEASE No. 257-83, Nov. 2, 1983.]

<> Frank A. Kennedy Inc. (Cape Canaveral, Florida) has been awarded a \$189,989 contract by NASA to modify the Flight Crew Training Building for a firing room display and a recreation of the lift-off of Apollo 11 which will be incorporated into the Kennedy Space Center tour. [Kassak. TODAY, p. 14C, Nov. 2, 1983.]

<> The maiden launch of Europe's Spacelab orbital scientific laboratory aboard the space shuttle Columbia was officially reset for November 28, 1983, announced NASA and the European Space Agency. Liftoff from Kennedy Space Center was set for 11 a.m. EST on the Monday following the Thanksgiving holiday weekend. A tight 14-minute opportunity exists for launch managers to get the mission off on the 28th, NASA said. Landing at the end of the nine-day, 11-minute mission is scheduled for 8:11 a.m. PST on December 7, at Edwards Air Force Base, California. "NASA management has confirmed that the shuttle system is ready to support the November date following the change of a solid rocket motor nozzle assembly," a jointly released NASA/ESA official announcement said. [Yacenda. TODAY, p. 1A, Nov. 3, 1983.]

November 3: Brown and Associates Management Services, Inc., known as BAMSI (Titusville, Florida) high-technology small business firm, was named Minority Contractor of the Year by the Kennedy Space Center. The award is presented annually to a minority firm which has excelled in providing services to KSC during the preceding fiscal year. BAMSI is headed by Hugh M. Brown, founder of the company, who now serves as president and chief executive officer. Brown, a former field engineer with ITT/Federal Electric Corporation, helped form and manage New World Services, Inc. [a library services company which is an EG&G subcontractor], for several years before founding BAMSI in 1978. [Tucker. NASA/KSC NEWS RELEASE No. 256-83, Nov. 3, 1983.]

<> Space shuttle Columbia's journey to Kennedy Space Center's Vehicle Assembly Building was the third such trek for Columbia in less than two months: two times to the VAB, and one time, on October 19, back to the hangar from the assembly building while repairs were performed on the shuttle solid rocket booster. With a November 28 launch date now set, technicians must hurry to reunite Columbia with the rest of the shuttle vehicle. "The vehicle is ready to go. She's in good shape, all buttoned up," NASA processing flow director James Harrington said. The move from the hangar was delayed nearly two hours by problems with a purge duct needed to draft air into the \$800 million Spacelab inside Columbia's cargo bay. The 27-minute tow to the VAB was complete at 11:45 a.m. EST.

The rest of the prelaunch schedule outlined by Harrington calls for installation of a final engine heat shield, running a confidence test of Columbia's new fuel cells - taken from the yet-to-be-delivered Discovery after another

new set of cells on Columbia malfunctioned - and programming both Columbia's and Spacelab's mass memory computer units. Those jobs plus integration testing of all shuttle connections are to be completed by Thanksgiving, giving workers a two-day breather before the final countdown picks up on November 28. Harrington said one of the last obstacles to a launch was cleared on Nov. 2 when engineers gave a clean bill of health to the shuttle's twin solid rocket booster exhaust nozzles. Concerns about the safety of one nozzle lining forced the shuttle from the pad Oct. 17, scrubbing what was supposed to be an Oct. 28 launch. Harrington said engineers gave a two-hour briefing on the state of the booster nozzles to NASA Administrator James M. Beggs Nov. 2, before Beggs and European Space Agency Director-General Erik Quistgaard decided on the new launch date. [Yacenda. TODAY, p. 16A, Nov. 4, 1983.]

November 8: Three weeks after its rollback from Pad 39A, Columbia returned to its launch site in final preparation for the November 28 liftoff of its Spacelab mission. Meanwhile, NASA announced the third member of its spaceplane fleet, the orbiter Discovery, was due to arrive at KSC from California atop a Boeing 747 carrier aircraft on November 9. [Yacenda. TODAY, p. 12A, Nov. 8, 1983.]

November 9: More than 100 spectators were on hand near the spaceport's 3-mile-long shuttle runway to greet the Discovery as it flew in atop its Boeing 747 carrier aircraft. Touchdown came at 1:46 p.m., following a single low pass over the spaceport runway by the 747/shuttle combination. "With the roll call of America's highest technology being Columbia, Challenger and Discovery, we can now say: 'All present and accounted for'," announced KSC spokesman Rocky Raab over the public address system set up for the occasion. Compared to its predecessors, the neat and trim Discovery appeared to be in the best condition yet for a newly delivered orbiter. NASA's latest spaceplane is outwardly different from its two fleet mates. A new type of thermal insulation blanket - called Advanced Flexible Reusable Surface Insulation (AFRSI) - was used on the upper half of Discovery instead of the white heat-protective tiles covering the topside of Columbia and Challenger. The approximately 2-foot-square AFRSI blankets are the same color and serve the same purpose as the former white tiles, but give a cleaner, less cluttered look to the craft. As Discovery was arriving to fanfare at one end of KSC, another component of the June 4 mission - the external fuel tank upon which Discovery will be mounted for launch - quietly arrived elsewhere at the space center. The 154-foot-long

tank came by barge from the Michoud, Louisiana, plant of Martin Marietta, where it was built. NASA's new orbiter, Discovery, is named after two sailing ships of history: Henry Hudson's Discovery, which made an ill-fated journey to what is now known as Hudson's Bay in 1610; and Capt. James Cook's Discovery, which in 1776 accompanied the legendary navigator to the Hawaiian Islands and Alaska on what was his last cruise. Construction on NASA's fourth and perhaps last reusable shuttle orbiter, dubbed Atlantis, is set to begin next year. [Yacenda. TODAY, pp. 1A & 20A, Nov. 10, 1983.]

November 11: Space agency officials ran into antenna problems with a relay satellite crucial to the upcoming shuttle mission, but said the difficulties should not affect the planned November 28 launch. One of two antenna packages on the satellite, which relays signals back and forth between the shuttle and the ground, is failing to respond properly to commands from the ground, officials said. Attempts to switch on a back-up system also were not fully satisfactory but engineers said they would continue to work on the problem. The malfunctioning antenna is actually part of a redundant system, providing back-up to the satellite's main antenna, which continues to function properly and could support the mission by itself.

KSC spokesman Mark Hess said engineers don't yet have a full understanding of the antenna problem, which has been growing worse the past two weeks, and are concerned that the same problem wouldn't strike the functioning antenna. Meanwhile, the shuttle's own Ku-band antenna was ordered back to the factory November 9, but again officials said the problem would not affect the launch schedule. Hess said the antenna was removed and sent back to the manufacturer, Hughes Aircraft Co. (El Segundo, California). The antenna, used to communicate with the Tracking and Data Relay Satellite (TDRS), is to be repaired and returned to KSC sometime in the next few days. The decision to remove the antenna came after a printed circuit board, similar to one that is part of the antenna package aboard Columbia, failed during qualification testing in a laboratory. "We did not feel confident that we could go through the whole mission and not have a problem," Hess explained. NASA said pre-flight work on Columbia is continuing over the three-day weekend, with workers testing the three new electricity-producing fuel cells recently installed on the orbiter. Acceptance testing also is proceeding on the agency's latest spaceplane, Discovery, which arrived at KSC November 9 and was rolled into an orbiter processing hangar early November 10. Next door to Discovery, the second member of the three-orbiter

operational fleet - Challenger - also is undergoing preparations for its late January launch. [Yacenda. TODAY, p. 20A, Nov. 11, 1983.]

November 16: Twenty years ago - today - President John F. Kennedy made his last visit to this NASA center; six days later, Kennedy was dead, assassinated in Dallas, Texas. As reported in the November 27, 1963 issue of the Spaceport News - the official center publication - Kennedy reaffirmed his support for space exploration in a speech issued just the day before his death. "There will be setbacks and frustrations and disappointments in space," Kennedy said. "And there will be pressures for our country to do less and temptations to do something else. But this research must and will go on. The conquest of space must and will go ahead."

Kennedy's November 16 visit was his third to the spaceport in the three years he was president. Previous visits came in February and September 1962. Kennedy's final visit lasted two hours and 20 minutes, but was packed with briefings and tours. Among the briefings the president received was one on Gemini program operations at Launch Complex 37, given by NASA Deputy Associate Administrator George M. Low and astronauts Gus Grissom and Gordon Cooper. Another briefing on the manned lunar program by NASA Associate Administrator George Mueller took place inside the complex 37 blockhouse. The late Wernher von Braun, who was director of the Marshall Space Flight Center in Huntsville, Alabama, also filled in the president on the capabilities of the new Saturn I rocket being readied for its first flight. Kennedy also walked underneath the 163-foot-tall vehicle, designated Saturn SA-5, for a closer look at its powerful engines, and asked von Braun if the rocket had any military possibilities. The president took time to shake hands with mechanics and technicians, and to ask them how things were going. An inspection of the Merritt Island Launch Area - as the complex that now forms the heart of Kennedy Space Center was known - followed aboard a Marine helicopter with Dr. Kurt H. Debus, who died on October 10th of this year. After the overfly, Kennedy boarded the USS Observation Island off Cape Canaveral to view a successful Polaris missile launch from the nuclear submarine Andrew Jackson before riding a helicopter back to the skid strip to fly on to South Florida. "I have found this visit most informative," Kennedy said to Debus prior to departure. "It has been a great help to me and will aid me in assessing our space programs." Debus said the president was "very much impressed with what he saw." [Yacenda. TODAY, pp. 1A & 20A, Nov. 16, 1983.]

<> A special radio antenna sent out for repairs last week returned to Kennedy Space Center several days early. Meanwhile, other NASA officials kept a close eye on problems besetting the sophisticated Tracking and Data Relay Satellite that acts as intermediary between the shuttle and the ground for data transmissions during the upcoming mission. KSC spokesman Jim Ball said technicians would reinstall the antenna on Columbia later this week, following loading of hazardous hypergolic reactants aboard the orbiter. All other preparations are continuing on schedule for the planned November 28 launch of the combined Shuttle Mission 9/Spacelab-1 flight, Ball said. Engineers still are not sure what caused one of two Ku-band antennae on the satellite to become inoperative. NASA spokesman Jim Elliott, at the Goddard Space Flight Center in Greenbelt, Maryland, said the problem appears to be with the traveling-wave tube assemblies on the defective antenna. A traveling-wave tube is an electron tube used for generation of microwave frequency radiation or amplification at ultrahigh frequencies. One of the problem antenna's tubes completely failed about two weeks ago, and the backup has produced insufficient power for the antenna to operate, Elliott said. The link between the satellite and the shuttle was affected. Engineers say the mission should be able to function properly with just one antenna, but the remaining antenna also has experienced some fluctuations in power output in the past. [Yacenda. TODAY, p. 20A, Nov. 16, 1983.]

November 17: Albert E. Seeschaaf, a NASA public information officer, manager of the Kennedy Space Center press site and a former radio newsman, died at home in Cocoa. Seeschaaf, 69, had cancer. Involved with America's space program since the early 1950s, Seeschaaf served as a civilian employee with the Military Sea Lift Command, where he oversaw logistics of the first down-range radar and tracking stations of the Atlantic Missile test range. He later worked with North American Aviation and Avco in rocket development programs, and from 1958 to 1967, was a reporter with radio station WEZY in Cocoa, where he was named news director in 1962.

After joining NASA in 1967, Seeschaaf served as a supply officer in the Apollo program. He later joined the space agency's public affairs staff in the protocol office, then moved to the spaceport's newsroom, where he dealt with representatives of the world's media. He was in charge of all logistical arrangements at the Complex 39 press mound at the time of his death, and letters, books and photos lining his office walls attest to the esteem in which newspeople

from many countries held Seeschaaf. He was particularly proud of his work with youths and recently cited that as his outstanding achievement. "Everyone has a mission on Earth, and mine has been to help young people," he said. Seeschaaf was founder of the YMCA in Brevard County and chief of staff of the Florida Civil Air Patrol. Active in the Boy Scouts for 50 years, the Scouts' Canaveral District honored Seeschaaf with a special commendation November 12.

"He will always be a part of the press site at the Kennedy Space Center because of the outstanding job he did in helping to put it together and keeping it running smoothly," KSC chief spokesman Hugh Harris said. "He'll be missed not only by us, but by newspeople around the world who came to rely on him to ensure that they had their facilities in place and operational." Dick Young, another KSC spokesman, said, "He was a great newsman and a great public affairs man for NASA, and we're all going to miss him....Al was an institution."

Seeschaaf is survived by his wife, Esther Seeschaaf of Cocoa and five children. [Yacenda. TODAY, pp. 1A & 20A, Nov. 18, 1983.]

November 25: The crew members of the ninth space shuttle mission arrived at Kennedy Space Center, saying they were ready and eager for liftoff on the 28th. "We really are in a hurry to get on with it," remarked John Young shortly after the six-member Columbia crew arrived at KSC following the two-hour flight from Houston. Young, who has more space trips to his credit than any other American astronaut, will command the nine-day mission, set to liftoff at 11 a.m. on Nov. 28. It will be the maiden voyage for the 17-ton NASA shuttle and \$800 million European-built Spacelab. "It's a beautiful day, ain't it," Young quipped as he and the other five crew members assembled on the KSC runway to say a few words to about 50 reporters and photographers covering the arrival. West German payload specialist Ulf Merbold, who will be the first non-American to fly on a U.S. spacecraft, predicted good things to come of the experiment-packed journey. "I think we'll fly a great mission, and I'm sure the scientists will get some good results," said Merbold. "I'm very proud to be the first European to fly on an American mission."

Merbold and Byron Lichtenberg, the other payload specialist on STS-9/Spacelab-1, arrived at the three-mile KSC runway aboard a Gulfstream jet. The aircraft also carried family

members of the astronauts. About 10 minutes after the Gulfstream landed, two blue and white two-seat T-38s circled the runway and touched down at 11:07 a.m. EST. Young and mission specialist Robert Parker shared one of the aircraft, and mission pilot Brewster Shaw and mission specialist Owen Garriott manned the other. About two hours after their arrival, Young, Parker, and Merbold were scheduled to sleep while the rest of the crew reviewed flight data and ate lunch. Because the astronauts will be operating in two shifts around the clock during the mission, they are adjusting to different sleep and work schedules. [Perez. TODAY, pp. 1A & 20A, Nov. 26, 1983.]

November 28: While forecasters brooded over stormy weather at emergency landing sites in Spain and West Germany, and a severe thundershower system approaching KSC, launch officials predicted no interference with the morning's 11 a.m. EST liftoff of Columbia and its Spacelab cargo. At a morning press conference on November 27, U.S. Air Force Major Donald J. Greene called launch-time weather "very questionable." Green, who is weather advisor to launch control, said the low pressure front moving through the Southeast could produce thunderstorms and strong winds at the space center, possibly delaying the launch. "It all depends on how fast that front moves in," Greene said. The last word on the weather will come from astronaut Bob Crippen, a veteran of STS-1 and STS-7. Crippen, in a Shuttle Training Aircraft over the KSC landing strip, will determine if weather conditions are favorable for launch and emergency landing at KSC, if necessary. [Shealy. TODAY, pp. 1A & 10A, Nov. 28, 1983.]

<> Many European Space Agency officials, including Director General Erik Quistgaard, were expected to be on hand to see the liftoff of Columbia. Michel Bignier, the agency's STS director, George van Reeth, the director of administration, and ESA's director general of the Commission of the European Communities Jean Albert Dinkespiler will watch the launch from the VIP stands. "We target the guest list to the mission," said Libby Wells, a KSC spokeswoman. "This is a joint mission and is also the Spacelab launch. We consider it [the guest list] to have the kind of people who are interested in the venture."

Political and technological representatives from seven European nations will also watch the launch from the VIP site. Included in that group are: Italy's Minister of Research Luigi Granelli; French astronauts Jean Loup

Chretien and Patrick Baudry; Swiss Ambassadors Aamin Kamer and Anton Hegner; and Professor Johannes Ortner, president of the Austrian Solar and Space Agency. Tom Stafford, a Gemini, Apollo and ASTP crewman and now chairman of the board of Omega Watch Co., heads the list of NASA astronauts and technicians on hand for the launch. Joining Stafford are John Creighton, Shannon Lucid, Loren Shriver and Jeff Hoffman, all assigned to missions in the coming year. Brevard Democratic Congressman Bill Nelson will be on hand for the launch, as will Don Fuqua, D-Fla., chairman of the House Space and Technology Committee. Fuqua is bringing with him about a dozen fellow congressmen and their spouses. Sudan's President Nimeiri is the sole foreign head of state who will attend the launch. [Feibus. TODAY, p. 3A, Nov. 28, 1983.]

<> "I don't know how it could get any better," said NASA Administrator James M. Beggs of the Columbia's 11 a.m. EST launch, right on schedule. Beggs and Erik Quistgaard, Director General of the European Space Agency, which gave the spacelab to NASA under a cooperative agreement, watched the launch from the firing room in the LCC. "It was superb," said launch director Al O'Hara, giving special praise to the contractor employees who have been under the "distraction" of changing jobs when a Lockheed team won the shuttle processing contract from the incumbent Rockwell team. From space, Commander John Young exulted about his sixth flight: "It's just super up here, just beautiful. Boy, it's really a beautiful flying machine and it just got up there like everybody said it would." This is the second flight for Owen Garriott, 53, who was aboard Skylab, and the first for pilot Brewster Shaw, 38, mission specialists Robert Parker, 45, Byron Lichtenberg, 35, and Ulf Merbold, 42, of West Germany, the first foreigner assigned to an American crew.

Only minor problems were encountered during the countdown. The weather was the big question mark. Forecasters had feared it might produce storms over the Kennedy Space Center at launch time, but the eastward-moving cold front unexpectedly slowed its pace and didn't make it. Because of Spacelab's 16-ton weight, heaviest to date for a shuttle, Edward Air Force Base's sprawling lakebed strip will be the landing site at 11:11 a.m. EST December 7, 1983.

Columbia's twin rocket boosters, which separated 2 minutes and 6 seconds after the shuttle's liftoff were spotted bobbing in the Atlantic Ocean less than an hour later. The empty rocket casings, which descend into the water on

parachutes, were being picked up by the two recovery ships (Freedom and Liberty) operated by NASA contractor United Space Boosters, Inc. The boosters fell to the ocean about 150 miles east of Cape Canaveral. "They appear to be in good shape, and the ships are moving into position for recovery," which takes several hours for each booster, said USBI spokesman Scott Brinckerhoff. Shuttle launch director Al O'Hara said he expected the reusable casings would be back at Cape Canaveral by the evening of November 29. [Jean. THE ORLANDO SENTINEL, pp. A-1 & A-19, Nov. 29, 1983. "Boosters Spotted Quickly," TODAY, p. 4A, Nov. 29, 1983.]

<> German astronaut Reinhard Furrer was among the 700 to 800 Europeans visiting Brevard County for inaugural launch of Europe's Spacelab; this was Furrer's first live liftoff. But unlike the other visitors, the 42-year-old Furrer hopes to ride aboard the shuttle in mid-1985, on the next Spacelab mission. A graying, bearded physics professor at the Free University in West Berlin, Furrer said he never imagined he would become an astronaut when, as a university student, he watched television coverage of John Glenn's first Earth orbits. "In Europe, then, there wasn't much hope of going into space," he said. "We Germans are a little sensitive when people say, 'oh, now Germany is going into space'," Furrer said, recalling Wernher von Braun's early rocket tests on German soil during World War II. A fellow German, standing beside the astronaut, summed it up. "Now we would like to rejoin the club," said Dr. Wolfgang Finke, director of the Ministry of Research and Technology in Bonn. Finke, a German representative to the 10-nation European Space Agency, said he is very proud of Spacelab, a walk-in compartment lined with cabinets and instrument panels.

"It's not parallel to anything the Americans have done. Of course, it needs transportation," Finke said. Because of the European dependency on the shuttle's booster power, Finke said the ESA is "definitely the junior partner with the U.S. in this venture." Spacelab presents three opportunities for research that cannot be duplicated on Earth, Finke said. "We can look into space without any obstruction from the Earth's atmosphere. We can look downward at the Earth. And we can do all these experiments in very low gravity." [Gelston. THE ORLANDO SENTINEL, p. A-19, Nov. 29, 1983.]

<> More than 100 foreign journalists joined about 750 of their American counterparts to cover the liftoff of the Shuttle/Spacelab 1 mission. But that didn't mean that Kennedy Space

Center was the only focus for international attention for the overseas journalists. Some were stationed in Houston to monitor Spacelab experiments and others, said Bernard Chabbert, a reporter with Europe-1, a French-language private broadcasting organization, covered the mission from a third press site - Cologne, West Germany. The group of European reporters who were at KSC were to have left for the Johnson Space Center right after the launch, Chabbert said.

European interest was especially high because of the European-built Spacelab. Also, "interest is real high" because Ulf Merbold, the first European on an American spacecraft, is a member of the latest crew, Chabbert said. "The fact that you have one crew member who is European is very appealing to the public," he said. Most of Europe's attention, however, is focused on Spacelab, the \$1.2 billion orbiting laboratory developed by the European Space Agency. NASA's share of the mission cost about \$600 million, bringing the total mission price to \$1.8 billion.

"The general feeling is NASA provides the transportation and Europe provides the science," Chabbert said. Not all European journalists shared Chabbert's views about the high interest in Spacelab's maiden voyage. Frederic Castel, the Florida and Central American correspondent for Quest-France, the largest daily newspaper in France, said outside West Germany and possibly a few other countries, interest is not very high among Europeans. His paper probably won't even have a front-page story on the launch, Castel said. At most, he said, the paper will have a "tease" directing readers to a launch story inside. "They [Europeans] react like Americans react when there's an Ariane launch," he said, referring to limited U.S. coverage given the ESA-sponsored rocket program.

The space mission received more attention on radio and television stations in Britain than in Germany. French space officials sent a telegram of congratulations to NASA on the successful launch. One German journalist dubbed the billion-dollar Spacelab, which was 55 percent financed by West Germany, "Europe's expensive ticket on the space train."

The 42-year-old Merbold, a Stuttgart-based physicist, was saluted in several German newspapers. "He's the man of the day," commented the mass-circulation daily Bild Zeitung. But the newspaper's short article was carried on an inside page and without the large headlines usually given by Bild to major stories. The flight received prominent play

throughout the day on radio and television in Britain, where pallet-mounts for telescopes, sensors and other Spacelab equipment was made by the Space and Communications sector of the British Aerodynamics Group. [Perez. TODAY, p. 2A, Nov. 29, 1983.]

<> The smallest crowd of shuttle-watchers to date, an estimated 100,000, ventured into and out of Brevard County with only one minor accident to report, according to county police. The Florida Highway Patrol brought in only two additional troopers, compared to the eight added for the first launch in April 1981, when the crowd was "guesstimated" to have reached one million spectators. [Heller. TODAY, p. 3A, Nov. 29, 1983.]

November 29: A wreath with black ribbon was placed on the door of the NASA Public Affairs Office last week. It was a memorial to Al Seeschaaf, who for years helped manage Kennedy Space Center's press site. The space pioneer died earlier this month after a bout with cancer. During the current shuttle mission, many members of the world's press were saddened to learn of Seeschaaf's death. "Certainly everybody misses him," KSC chief spokesman Hugh Harris said.

Seeschaaf died on November 17, 1983. ["Media Remember NASA's Seeschaaf," TODAY, p. 4A, Nov. 29, 1983.]

DECEMBER 1983

December 2: The third in a new generation of Western Union telecommunication spacecraft was unveiled at Cape Canaveral Air Force Station for the first time. To be launched from Kennedy Space Center on the next flight of the space shuttle Challenger in late January, the satellite - dubbed WESTAR VI - will be the first craft in the series to be deployed from the shuttle. [Yacenda. TODAY, p. 12A, Dec. 3, 1983.]

December 5: The 44-hour countdown for the ninth space shuttle mission deviated no more than 30 minutes from its plan despite a problem that would have delayed launch 72 hours if it had occurred earlier in the shuttle program. The shuttle mission management team analyzed the problem over a period of about 3 hours and at about T-2 hours concluded that there was adequate redundancy to maneuver the orbiter without the failed switch activator. The primary redundancy option was to use the reaction control system for maneuvering. [Kolcum. AVIATION WEEK & SPACE TECHNOLOGY, p. 21, Dec. 5, 1983.]

<> Launch of the shuttle orbiter Columbia/Spacelab 1 mission required greater vehicle maneuvering and higher thrust than any previous shuttle ascent to boost the heavy U.S./European payload on a northern trajectory up the U.S. East Coast. Orbiter main engine shutdown and insertion into a 57-degree orbit that carried the vehicle over most of the Earth's landmass occurred 140 miles east of Atlantic City, New Jersey. The launch orbital insertion accuracy for Spacelab 1 was important because of the timing and ground tracking requirements for the multiple science objectives of the mission. ["Mission 9 Ascent Required High Level of Maneuvering," AVIATION WEEK & SPACE TECHNOLOGY, p. 23, Dec. 5, 1983.]

December 8: To make some room at KSC for the returning Columbia, program managers have decided to move the newest shuttle Discovery out of the Orbiter Processing Facility where it is presently located and into the massive Vehicle Assembly Building. Then, Columbia will slide into the spot in the OPF vacated by Discovery. Columbia's return was anticipated to be midday December 13, KSC spokesman Mark Hess said. Discovery will roll to the VAB about 12:30 p.m.

EST on December 9, while other shuttle team members are at Edwards Air Force Base, California, readying Columbia for its return to Florida aboard its 747 carrier jet. After a basic post-flight servicing in the OPF at KSC, Columbia will be reattached to its carrier jet and returned to the Rockwell International factory in Palmdale, California, for a series of modifications - primarily involving instrumentation and electronic controllers. When Columbia leaves KSC for California, Discovery is scheduled to return to the OPF and trade places with Challenger which is to head for the VAB in preparation for its January 30 return to space. [Yacenda. TODAY, p. 14A, Dec. 8, 1983.]

December 15: The space shuttle Columbia, bolted on top its 747 carrier jet, came back to Kennedy Space Center, touching down on the spaceport's 3-mile-long runway under overcast skies at 2:51 p.m. EST. The APU investigating team, under the direction of Richard Colonna of the Johnson Space Center in Houston, hoped to get access to the fire-damaged APU's by as early as the morning of the 16th, after Columbia is returned to one of KSC's two orbiter processing facilities. Based on information supplied by a KSC spokesman, it was incorrectly reported that the investigation would be a Kennedy function. Johnson, which bears ultimate responsibility for the orbiter, will actually conduct the investigation, said KSC spokesman Jim Ball, who said: "We're not going to fly until we understand the problem." [Yacenda. TODAY, p. 1A, Dec. 16, 1983.]

<> NASA's Kennedy Space Center awarded S&O Air Conditioning, Inc. (Cocoa, Fl.) a \$232,930 contract for modifications to the Halon fire protection system and air conditioning system at KSC's Guided Unified "S" Band (GUSB) Facility. The fixed-price contract was initiated on November 30, and will extend through June 27, 1984. This award is one set aside for award to a small business firm. Under the terms of the contract, modifications will be made to the existing Halon system used at the GUSB Facility. Appropriate modifications must also be made to the air conditioning system so that it will operate effectively with the Halon system. New chill water lines will also be added in preparation for a new air handling unit. [Malone. NASA/KSC NEWS RELEASE No. 301-83, Dec. 15, 1983.]

<> A fire and explosions that disabled two of space shuttle Columbia's hydraulic power units probably won't delay the next shuttle launch January 30, 1984, NASA Administrator

James Beggs said. Challenger is scheduled to make the January flight, and Beggs said its hydrazine seals appear to be in good shape. But he said Challenger won't be cleared for flight until the problem has been resolved. As to a possible postponement of Challenger's flight because of Columbia's problems with its power units and computers, Hess said, "How can you address a delay until you know what's wrong?" NASA spokesman Jim Ball said there is a possibility generic problems may be lurking in Challenger's computers and power units as well. ["Shuttle Delay Unlikely: Columbia Returns Home for Checkup," THE ORLANDO SENTINEL, pp. 1C & 13C, Dec. 16, 1983.]

<> NASA Administrator James M. Beggs announced that ordinary citizens might fly aboard the space shuttle as early as 1985. Under a plan still being developed by NASA, several citizen observers could be carried each year on the shuttle, once the selection process gets under way. Agency spokesman Rocky Raab said no method for selection had been decided on yet, and no applications for what are expected to be highly coveted spots were yet being accepted. Beggs said that citizens selected to fly on the shuttle would be on the NASA payroll for a required training period and the flight, at least at the beginning of the program. Preliminary indications are that preflight training for non-career crew members would be about six months long. "Professional communicators" such as journalists, writers, artists and poets "would be among the likeliest to fly first," Beggs' announcement said. The reason is that NASA would like to have people better able to relate their voyages on-board the shuttle to make the experience of space flight more accessible to the common person. [Yacenda. TODAY, p. 20A, Dec. 16, 1983.]

December 19: Now that the \$1 billion Spacelab had returned to the Kennedy Space Center, the lengthy process of disassembling the lab and getting it ready for the second flight in November 1984 must begin. The orbiting lab was supposed to have been removed from Columbia's cargo bay on the 17th. Troubles with the orbiter's auxiliary power units which exploded and caught fire at the conclusion of the mission have created a problem, however. NASA investigators wanted to gain access to the affected units before opening the cargo bay doors. The revised schedule now calls for the Spacelab to be extricated from Columbia either late on the 19th or early on the 20th. Workers will then remove any of the 36-plus experiments remaining in the Spacelab and break down racks and floors used for the first flight. A complete

test must be run on all Spacelab components before refurbishment for the second mission (Spacelab 3) begins. [Yacenda. TODAY, p. 14A, Dec. 19, 1983.]

<> The National Aeronautics and Space Administration says it will turn over operations of the Kennedy Space Center's Atlas-Centaur launch complex to private industry under terms to be negotiated in January, 1984. [Nelson. USA TODAY, p. 1B, Dec. 19, 1983.]

<> An old space capsule reported stolen last week from the defunct SST Air Museum in Kissimmee has been recovered and is in the custody of the Hillsborough County Sheriff's Department officials said. The capsule was found the night of Dec. 18 in a miniwarehouse in St. Petersburg, said Sgt. July Rivers, an investigator with the Osceola County Sheriff's Department. An investigation into the theft is continuing. The Mercury 1 capsule flew an unmanned mission in the early 1960s. Neither NASA nor the Smithsonian Institution in Washington had any record of the Mercury capsule being on loan to the SST museum. But officials in Kissimmee said it was from a mission that failed and the capsule had been salvaged from the ocean floor. The SST museum, which closed in June 1981, formerly housed several dozen vintage aircraft and thousands of model planes. ["Stolen Space Capsule Found," THE ORLANDO SENTINEL, p. B-3, Dec. 20, 1983.]

<> Reports of the theft of the capsule and its subsequent recovery revived interest in the old spacecraft, basically because officials at NASA and the Smithsonian Institution in Washington had no record of where it went. "It has definite historical value," said Greg Kennedy, assistant curator of the Smithsonian's Space Science and Exploration department. "It represents a unique chapter in the history of the early space program." Kennedy and other officials said the MA-1 is special because it was the first Mercury capsule to be launched. It's also significant in that its mission was a failure.

NASA launched MA-1 on July 29, 1960, in what was supposed to be a 150-mile suborbital flight. The mission: check the structural integrity of the Mercury capsule. NASA scientists needed to be sure the capsule would protect the astronauts in space. But its mission didn't turn out the way engineers had planned. Records show that Cape Canaveral

was fogged in, but NASA went ahead with the launch. Sixty-five seconds into the mission, the Atlas went off course and engineers activated the rocket's self-destruct mechanism. The capsule fell to the ocean floor. It was recovered by NASA several weeks later, but was smashed beyond repair by the fall from 40 miles up.

Sgt. July Rivers (see preceding item) said he followed the trail of the stolen capsule to Tampa and then to St. Petersburg. Rivers said he still doesn't know why the capsule was stolen. "The only thing I can figure is that they recognized the historical value." No arrests have been made, but the investigation continues. [Kilsheimer. THE ORLANDO SENTINEL, p. C-8, Dec. 22, 1983.]

<> The launch schedule for the next space shuttle mission underwent reassessment due to hydrazine fuel leaks that ignited small fires around two of Columbia's auxiliary power units shortly before landing at Edwards AFB, CA, December 8. The leaks and resulting minor fires had no effect upon APU performance till several minutes after landing, when both shut down automatically and some small assemblies detonated due to the fire's heat. The explosions were not detected at the time either by the crew onboard or technicians outside the vehicle. [Smith. AVIATION WEEK & SPACE TECHNOLOGY, p. 26, Dec. 19, 1983.]

December 31: Total attendance for the year at Kennedy Space Center's Visitors Information Center was 1,869,635, down from 1982's total of 1,887,670 and 1981's total of 2,008,000. [VIC, Jan. 9, 1984.]

Appendix A

NASA Expendable Launches for 1983

<u>Date</u>	<u>Payload</u>	<u>Launch Vehicle</u>	<u>Launch Site</u>	<u>Mission Remarks</u>
January 25	IRAS	Delta	WSMC*	Infrared astronomy.
March 28	NOAA-E	Atlas-F	WSMC	NOAA weather & SARSAT.
April 11	RCA-F	Delta	ESMC**	RCA communications.
April 28	GOES-F	Delta	ESMC	NOAA weather.
May 19	Intelsat V-F	Atlas-Centaur	ESMC	Intelsat communications.
May 26	EXOSAT	Delta	WSMC	European Space Agency.
June 28	Galaxy-A	Delta	ESMC	Hughes Communications, Inc.
June 28	HILAT	Scout	WSMC	Air Force research and development.
July 28	Telstar 3-A	Delta	ESMC	AT&T communications.
August 25	RCA-G	Delta	ESMC	RCA communications.
September 22	Galaxy-B	Delta	ESMC	Hughes Communications, Inc.

*WSMC - Western Space and Missile Center, Vandenberg Air Force Base, Calif.

**ESMC - Eastern Space and Missile Center, Cape Canaveral Air Force Station, Fla.
[NASA ACTIVITIES, December 1983, p. 17.]

Appendix B

NASA Space Shuttle Launches for 1983

<u>Date</u>	<u>Launch Number</u>	<u>Orbiter</u>	<u>Launch Site</u>	<u>Payload</u>	<u>Crew</u>
April 4	6	Challenger	KSC*	TDRS-A	Weitz, C; Bobko, P; Peterson, Musgrave, MS
June 18	7	Challenger	KSC	OSTA-2; SPAS-01; Telsat-F; Palapa B-1	Crippen, C; Hauck, P; Fabian, Ride, Thagard, MS
August 30	8	Challenger	KSC	INSAT 1-B; PFTA	Truly, C; Brandenstein, P; Gardner, Bluford, Thornton, MS
November 28	9	Columbia	KSC	Spacelab-1	Young, C; Shaw, P; Garriott, Parker, MS; Lichtenberg, Merbold (ESA), PS

*KSC - Kennedy Space Center, Florida
[NASA Activities, December 1983, p. 7.]